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19 February 1980

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 30

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DEVELOPMENTS IN ACTU POLICY ON URANIUM REPORTED

Low Priority in Budget

Melbourne THE AGE in English 28 Nov 79 p 1

[Article by Mike Gordon]

[Excerpts] The ACTU has given its campaign against uranium mining second-last priority in its financial plan for the next year.

A report prepared by ACTU officers allows only $20,000 for uranium policy out of a total $2.2 million, ranking it number 18 out of 19 policy areas.

The report is being considered by unions in ACTU industry groups this week.

The financial report says $20,000 is needed to implement the uranium policy, which "calls for a publicity campaign and a promotion of the policy".

Under the policy, the ACTU executive is called on to co-ordinate a campaign "to convince the Australian public and those presently working in the industry of the dangers and consequences of the mining of uranium".

Several unions are expected to pledge funds above the $20,000 allocation to finance the campaign.

Key Unions Reject Policy Call

Melbourne THE AGE in English 1 Dec 79 p 1

[Article by Michael Gordon, "our Chief Industrial Reporter"]

[Text] A meeting of key unions yesterday decided not to block the mining and export of uranium.

The 24 unions covering the uranium industry rejected a plan to vigorously enforce the ACTU policy against uranium.

The Melbourne meeting voted against a proposal to involve all ACTU affiliates in the anti-uranium campaign and to back to policy with industrial action.

The ACTU president, Mr. Hawke, told the meeting that no unions had taken effective action to stop the mining of uranium since the policy was adopted in September.

The Waterside Workers' Federation has dropped plans to ban handling of uranium from today because other unions have not committed themselves to similar action.

The meeting placed the onus on individual unions with members in the industry to conduct their own education campaigns on the dangers of uranium.

The plan to enforce the policy vigorously was put to the meeting by the senior vice-president of the ACTU, Mr. Cliff Dolan.

He said last night that while the meeting produced nothing positive, it did not overturn the policy decision of the ACTU congress in September.

Mr Hawke said the ACTU was producing a pamphlet setting out the uranium policy for distribution to affiliates.

But he said: "The industrial reality is a matter of what unions will, can, will not, or cannot, do.

"That's the reality, and now it's back to the unions."

Union leaders at the meeting yesterday voted 13-11 to defeat Mr. Dolan's proposal.

Affiliates

His nine-paragraph plan said the congress made a firm declaration of opposition to uranium mining and export.

The plan required that:

Every affiliate of the ACTU play an active part in "arousing public opposition to uranium mining";

A campaign of explanation about the dangers of uranium and the nuclear fuel cycle be developed in union journals and in circulars to job delegates;

The Federal Government be told of the policy and "also informed that as part of the campaign of opposition, various forms of industrial activity may be undertaken".

Decisions to impose industrial bans would be determined "by the due processes of the ACTU constitution, with all unions concerned being consulted".

The meeting decided instead to recommend to the ACTU executive that a further meeting be held at an "appropriate time" to report on the progress of individual union campaigns.

Mr. Dolan said that while he was disappointed with the outcome of the meeting, he still believed the ACTU policy could be implemented.

At the meeting, one ACTU officer is understood to have told the unions that it was up to them to take action individually if they felt it was necessary.

The meeting was called by the ACTU executive at the request of the Waterside Workers' Federation after the September congress.

The Federation had resolved to ban the handling of uranium cargoes from today in the condition that other unions involved in the industry would take "similar steps to implement ACTU policy".

CSO: 5100

AUSTRALIA

PRESS COMMENTS ON ACTU DECISION ON URANIUM

Recognition of Reality

Canberra THE AUSTRALIAN in English 3 Dec 79 p 6

[Editorial: "Energy Gamesmanship"]

[Text] TWISTINGS and turnings by union leaders whose members are involved in various ways with uranium mining clearly indicate that the twin influences of emotiveness and ideological gamesmanship are being brought up short by reality. And about time, too.

An ACTU conference on Friday, called to sort out the tangle caused by an ACTU Congress decision in September to ban the mining and export of uranium, failed to reach any sort of agreement on future tactics to enforce the ban — because it is unenforceable. Too many unionists, unimpressed by the posturings of their leaders, are opposed to the ban and are working in the uranium industry. They are earning good money and intend to go on earning it. And they know that world opinion is on their side, pressured by global worry about the urgent need for development of alternative energy sources — not only because of the looming crisis in overall reserves of oil but because of the immediate dangers of dislocation, even discontinuance, of supplies as violent spasms of unrest rack the OPEC countries.

Many countries need uranium to produce energy — either to maintain their rate of development or to initiate development. As a result of violently militant unrest in the Middle East, the comparatively leisurely timetable leading toward increased use of nuclear power has been greatly accelerated. This applies to research and development of all forms of alternative energy — and Australian governments and people must realise that. So far as use of nuclear-generated energy is concerned, the need for uranium is immediate. Thus, we must mine and export it to keep the world turning over.

Many — including *The Australian* and Mr Hawke, who spoke strongly to the congress against the ban but was defeated — have recognised these facts of life for some time. The Australian Labor Party and the ACTU have not — or, if they have, have refused to concede them. Now they find themselves out of step — not only with world needs but with the feeling of large numbers of Australian workers they claim to represent.

Both the A.L.P. and the ACTU must find a quick way to free themselves from their self-inflicted straitjackets and rejoin the real world.

Hawke 'Proved Right'

Brisbane THE COURIER-MAIL in English 3 Dec 79 p 4

[Editorial: "Uranium Bans"]

[Text] **THE Australian Council of Trade Unions president (Mr. Hawke) has been proved right over union action on uranium.**

In September Mr. Hawke warned the A.C.T.U. congress against banning the mining and export of uranium because it would be impossible to implement such a policy. His advice was disregarded.

A Waterside Workers' Federation ban on the handling of cargoes for the uranium industry was to have come into force at the weekend, but did not. The W.W.F. action depended on other unions taking similar steps. Sensibly they declined.

Although bans probably will remain official A.C.T.U. policy at least until the next congress, there should be no further attempt to implement them.

The mining and export of uranium will provide employment for thousands of Australians, and a source of energy for countries sorely in need of it. The industry should develop as planned, but subject to the strictest safety measures.

Decision Called 'Sensible'

Melbourne THE AGE in English 4 Dec 79 p 11

[Editorial: "When a Ban Is Not a Ban"]

[Text] SINCE September, when Australian union leaders gathered at the ACTU Congress in Melbourne and voted overwhelmingly to continue the ban on the mining and export of uranium, the development of the Nabarlek and Ranger mines has proceeded with little hindrance from workers. While the majority of delegates to the congress voted to reject the ACTU executive's recommendation that the two-year-old ban be lifted, the workers at the sites have ensured that development has continued. Faced with what appeared to be a grass-roots revolt against the congress decision, the 24 key unions in the uranium industry voted in Melbourne on Friday against any further bans, at least for the time being. It was a sensible decision that appears more closely to reflect the wishes of union members than the resolution that flowed from the congress. It was also instructive to those who see the ACTU or the trade union movement as a monolith responsible only to a few political mischief-makers who claim to be representative spokesmen. In this case, at least, their views have been seen to be unrepresentative.

The original congress decision was unrealistic. In a period of already high unemployment, it would have required many workers to deny themselves the chance to work, or at least to take a pay cut for refusing to do that portion of their work that, in the case of transport and waterside workers, involved the handling of yellowcake. While members of some unions, notably the Left-wing Miscellaneous Workers Union, were queueing for jobs at uranium sites, other unionists were being asked to perform an act of self-denial by refusing to handle the ore those workers produced. The Waterside Workers' Federation, which called for Friday's meeting, was prepared to continue its ban on loading yellowcake if other unions involved in the uranium industry committed themselves to similar action. Such an undertaking was not forthcoming on Friday and the waterside workers' ban was lifted. Instead, the unions agreed to concentrate their efforts on educating members on the dangers posed by uranium.

In effect, then, the ACTU ban on the mining and export of uranium is now only a paper tiger. This is not to say the unions cannot play a useful role in focusing public debate on some of the problems associated with uranium. For example, there is as yet no satisfactory method of storing radioactive waste. But the ban took no account of the changing global consensus about the role and nature of nuclear power. The growth of the nuclear power industry has slowed to a crawl, particularly in North America and, in those countries that believe they cannot do without it, more care is being taken to ensure that incidents like the one at Three Mile Island do not occur. There has been a general tightening of safety procedures and the Federal Government appears to be taking reasonably tough action to ensure that no Australian yellowcake finds its way into nuclear weaponry. The ACTU ban, therefore, was becoming an unnecessary infringement on Federal Government responsibilities. Some problems remain, particularly with the policing of the Government's safeguards agreements with buyers of our yellowcake. The unions can play an important role in keeping the Government on its toes. But the ACTU ban was ineffective and, had it been allowed to continue, might have done more to hinder than to encourage national discussion of the uranium issue.

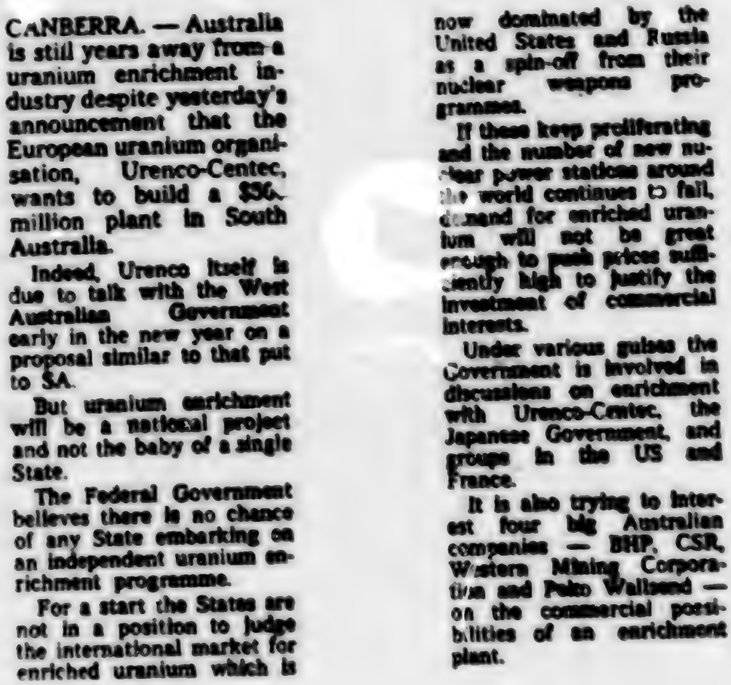
CSO: 5100

FEDERAL GOVERNMENT INVOLVED IN URANIUM ENRICHMENT PLANS

Melbourne THE AGE in English 12 Dec 79 p 4

[Article by Nigel Wilson]

[Text]



CANBERRA. — Australia is still years away from a uranium enrichment industry despite yesterday's announcement that the European uranium organisation, Urenco-Centec, wants to build a $56-million plant in South Australia.

Indeed, Urenco itself is due to talk with the West Australian Government early in the new year on a proposal similar to that put to SA.

But uranium enrichment will be a national project and not the baby of a single State.

The Federal Government believes there is no chance of any State embarking on an independent uranium enrichment programme.

For a start the States are not in a position to judge the international market for enriched uranium which is now dominated by the United States and Russia as a spin-off from their nuclear weapons programmes.

If these keep proliferating and the number of new nuclear power stations around the world continues to fall, demand for enriched uranium will not be great enough to push prices sufficiently high to justify the investment of commercial interests.

Under various guises the Government is involved in discussions on enrichment with Urenco-Centec, the Japanese Government, and groups in the US and France.

It is also trying to interest four big Australian companies — BHP, CSR, Western Mining Corporation and Peko Wallsend — on the commercial possibilities of an enrichment plant.

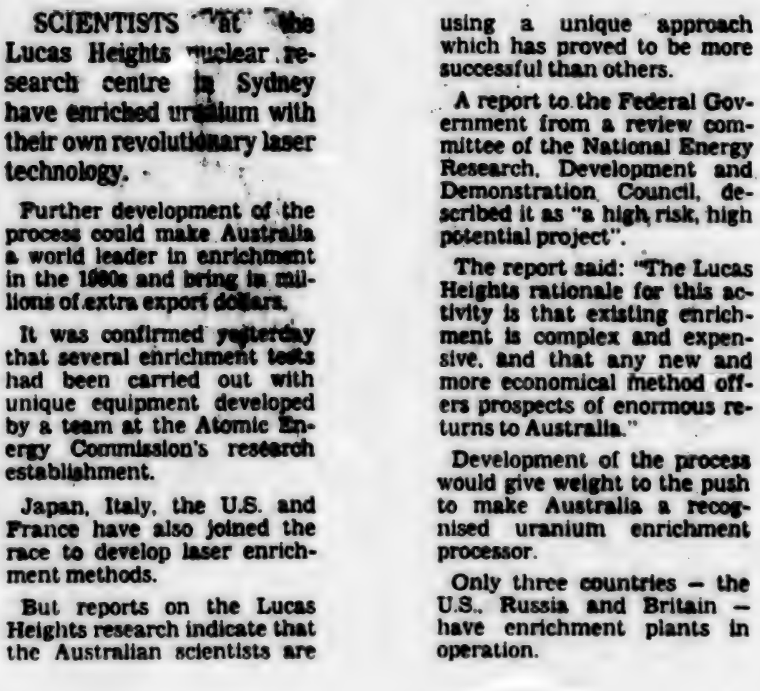
CSO: 5100

SCIENTISTS AT LUCAS HEIGHTS DEVELOP NEW ENRICHMENT PROCESS

Canberra THE AUSTRALIAN in English 28 Nov 79 p 1

[Article by John Dux]

[Text]



SCIENTISTS at the Lucas Heights nuclear research centre in Sydney have enriched uranium with their own revolutionary laser technology.

Further development of the process could make Australia a world leader in enrichment in the 1980s and bring in millions of extra export dollars.

It was confirmed yesterday that several enrichment tests had been carried out with unique equipment developed by a team at the Atomic Energy Commission's research establishment.

Japan, Italy, the U.S. and France have also joined the race to develop laser enrichment methods.

But reports on the Lucas Heights research indicate that the Australian scientists are using a unique approach which has proved to be more successful than others.

A report to the Federal Government from a review committee of the National Energy Research, Development and Demonstration Council, described it as "a high risk, high potential project".

The report said: "The Lucas Heights rationale for this activity is that existing enrichment is complex and expensive, and that any new and more economical method offers prospects of enormous returns to Australia."

Development of the process would give weight to the push to make Australia a recognised uranium enrichment processor.

Only three countries — the U.S., Russia and Britain — have enrichment plants in operation.

LUCAS Heights researcher, Mr John Eberhardt, with the laser equipment used in the new uranium enrichment process.

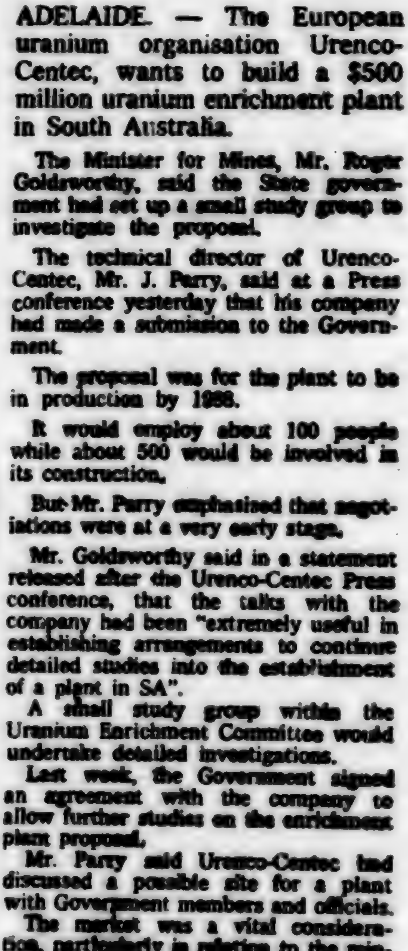
CSO: 5100

WEST, SOUTH AUSTRALIA BID FOR ENRICHMENT PLANT

Plans for South Australia

Melbourne THE AGE in English 11 Dec 79 p 1

[Text]



ADELAIDE. — The European uranium organisation Urenco-Centec, wants to build a $500 million uranium enrichment plant in South Australia.

The Minister for Mines, Mr. Roger Goldsworthy, said the State government had set up a small study group to investigate the proposal.

The technical director of Urenco-Centec, Mr. J. Parry, said at a Press conference yesterday that his company had made a submission to the Government.

The proposal was for the plant to be in production by 1988.

It would employ about 100 people while about 500 would be involved in its construction.

But Mr. Parry emphasised that negotiations were at a very early stage.

Mr. Goldsworthy said in a statement released after the Urenco-Centec Press conference, that the talks with the company had been "extremely useful in establishing arrangements to continue detailed studies into the establishment of a plant in SA".

A small study group within the Uranium Enrichment Committee would undertake detailed investigations.

Last week, the Government signed an agreement with the company to allow further studies on the enrichment plant proposal.

Mr. Parry said Urenco-Centec had discussed a possible site for a plant with Government members and officials.

The market was a vital consideration, particularly in relation to the mining of uranium in Australia generally and in SA in particular, he said.

Safe and clean

Uranium and enrichment were vital supplies for most electrical utilities in Europe, Japan, the US and elsewhere.

Mr. Parry said the plants operated by Urenco-Centec were "safe and clean".

The plant could be safely sited close to urban areas.

"But so far as we are concerned, we have no particular requirements which dictate the actual location of the plant," Mr. Parry said.

"There are many sites which could be suitable.

"We are dealing with a safe, clean process which has no effluent.

"In Europe and the UK, our plants are situated close to centres of very high population. This is the safest industry we know."

Mr. Parry said the only hazard from an enrichment plant was hexafluoride gas.

But very stringent precautions were taken to prevent gas leakages.

Mr. Parry said there would have to be further negotiations and studies before work could start on the plant, but the first site clearance work could take place in 1982-83 with production beginning in 1988.

South Australia's Plans Scored

Sydney THE SYDNEY MORNING HERALD in English 12 Dec 79 p 11

[Text]

MELBOURNE. — Plans by the European uranium processing organisation, Urenco Centec, to construct a $500 million uranium enrichment plant in South Australia were strongly criticised yesterday by the anti-uranium group, Friends of the Earth.

A spokesman for the group, Mr J. R. Hallan, claimed the project would be a mammoth waste of South Australian taxpayers' money for what could be "an economic white elephant."

"It is high time the Government came out of fantasy land and realised that nuclear power is not the way of the future, but is a technology whose time has past," he said.

Friends of the Earth had pointed out many times that world demand for uranium and enrichment capacity was declining.

Urenco-Centec announced on Monday that it had made a submission to the State Government for the construction of a uranium enrichment plant.

The technical director of Urenco-Centec, Mr J. Parry, said on Monday the proposal was for a plant which would be in production by 1988. It would employ about 100 people and another 500 would work on its construction.

Negotiations were at an early stage, he said.

Mr Parry stressed that plants operated by Urenco-Centec were "safe and clean," without significant effluents.

The enrichment plant could safely be built close to urban areas.

West Australian Plans

Perth THE WEST AUSTRALIAN in English 15 Dec 79 p 26

[Text] Western Australia was ideally located to have the nation's first uranium enrichment plant, the Minister for Industrial Development, Mr Mensaros, said yesterday.

Raw material would be available from the Yeelirrie uranium project, due to begin producing in 1984, and the enriched uranium, would be used in WA's nuclear power station planned for the mid-1990s.

Uranium exports would generate significant economic benefits. The WA Goverment would immediately begin preparing a detailed submission to support its long-held claim for Australia's first uranium enrichment plant.

Mr Mensaros was speaking after a meeting in Perth with officers of Urenco-Centec, an organization set up by the governments of Britain, the Netherlands and West Germany to use gas-centrifuge technology on a commercial scale to enrich uranium.

He said he had talks with the group in London last year and had pledged full cooperation in any studies.

Urenco-Centec had given the WA government details of requirements for a WA enrichment plant yesterday. These would help the WA submission.

The Federal Government was setting up an industry study group to examine the feasibility of an enrichment plant in Australia.

CSO: 5100

AUSTRALIA

URANIUM TRANSPORT REPORTED TO OPEN UP NEW SPECIALTY

Melbourne THE AGE in English 11 Dec 79 p 27

[Text] [THE AGE editor's note: "As Australia increases its uranium output, the need for special skills to transport and sell it grows. Deirdre Macken, in Sydney, talks to two specialists in the area.]

Being intimately involved in the politically sensitive area of uranium doesn't disturb Peter Crooks and John Ross.

While they maintained a fairly low profile, both freely talk on the problems of selling, transporting, dumping and safety aspects of the energy source.

"We don't believe in the locks and bolts image the industry has acquired. You won't see any armed guards around here".

The tag they put on themselves is "highly specialised consultants in resources marketing" which means they arrange for the selling and transport of uranium.

Peter Crooks is managing director of Neuxco Pacific Pty Ltd, part of the world-wide Nuexco group, which handles about one third of all uranium trade in the free world.

Both he and John Ross also run Pacific Energy Services, which has the local agency for EDLO International, the biggest transporter of nuclear material in the world.

While Neuxco expects to play a dominant role in selling Australia's uranium, Pacific Energy Services has opened up a big opportunity in a largely neglected area for the duo.

The transport of all forms of nuclear material is governed by a gamut of strict guidelines, including specific containers, shielding, cleaning methods, shipping, the type of trucks and even specially designed valves.

In Australia, PES will initially concentrate on the transport of yellowcake, which is virtually harmless.

But despite yellowcake's inherent stability, the public's fear of all forms of nuclear material will force carters to include numerous safety measures for transporting it.

Hence, "to cater for the public's misunderstanding" as Mr. Ross put it, PES will be advising on numerous safety precautions, especially on the road transport of yellowcake.

PES' job will become much more difficult if, as generally expected, enrichment plants are set up in Australia. The requirements for transporting enriched uranium would be such that specialist advice would become almost mandatory.

Although the uranium market has softened with the Three Mile Island accident and a rush to coal resources, Peter Crooks is confident that in the long-term, uranium's future as a major energy supply is assured.

Peter Crooks, an engineer and scientist, has been involved in the aeronautical industry, has worked at Lucas Heights power station and was Australia's atomic energy councillor in Washington before "selling his soul to the devil" and joining the nuclear power stations of the US.

But his desire to settle in Australia finally turned him to Nuexco, when it was looking to set up in Australia 15 months ago.

John Ross, a chemist, spent 20 years in the oil industry before joining the Fleur group of the US as business develoment manager in NSW and Queensland.

But the opportunities for exploiting Australia's natural resources caught his eye and Mr. Ross formed John Ross and Associates, which is primarily involved in market development of the oil and gas industries.

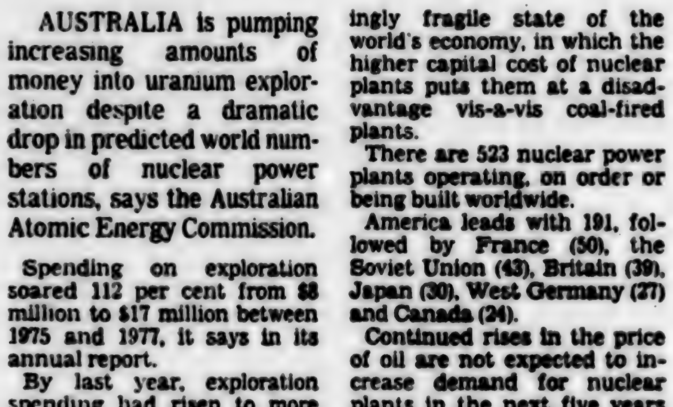
CSO: 5100

INCREASING AMOUNTS INVESTED IN URANIUM EXPLORATION

Canberra THE AUSTRALIAN in English 27 Nov 79 p 9

[Article by Peter Young]

[Text]



AUSTRALIA is pumping increasing amounts of money into uranium exploration despite a dramatic drop in predicted world numbers of nuclear power stations, says the Australian Atomic Energy Commission.

Spending on exploration soared 112 per cent from $8 million to $17 million between 1975 and 1977, it says in its annual report.

By last year, exploration spending had risen to more than $23 million, even though experts are now forecasting a drastically diminished role for nuclear power in the next two decades.

Nuclear plant numbers in the West, by contrast, are predicted to grow much more slowly — for reasons ranging from economic uncertainty to tighter environmental constraints.

The commission's new forecast puts the Western world's nuclear power capacity next year at only 66 per cent of the 1975 prediction.

That will slump to 50 per cent of earlier forecasts by 1985, 44 per cent by 1990, and 33 per cent of earlier figures by the turn of the century.

The downward trend reflects slowing growth rates in demand for electricity, the report says.

It links this to the increasingly fragile state of the world's economy, in which the higher capital cost of nuclear plants puts them at a disadvantage vis-a-vis coal-fired plants.

There are 523 nuclear power plants operating, on order or being built worldwide.

America leads with 191, followed by France (50), the Soviet Union (43), Britain (39), Japan (30), West Germany (27) and Canada (24).

Continued rises in the price of oil are not expected to increase demand for nuclear plants in the next five years because of the time required to commission new plants, the report says.

To the contrary, higher oil prices could well further limit the growth of nuclear plants by upsetting world economic activity even more and thus progressively reducing industrial demand for electricity, it argues.

The slowing pace of nuclear plant construction is to some extent due to normal slippages in current building schedules, says the commission, which expects adverse publicity surrounding the Three Mile Island radiation leakage will not become "a major factor in long-term growth".

But it concedes heightened public awareness of nuclear safety factors has led to a tougher stance on nuclear development by many governments.

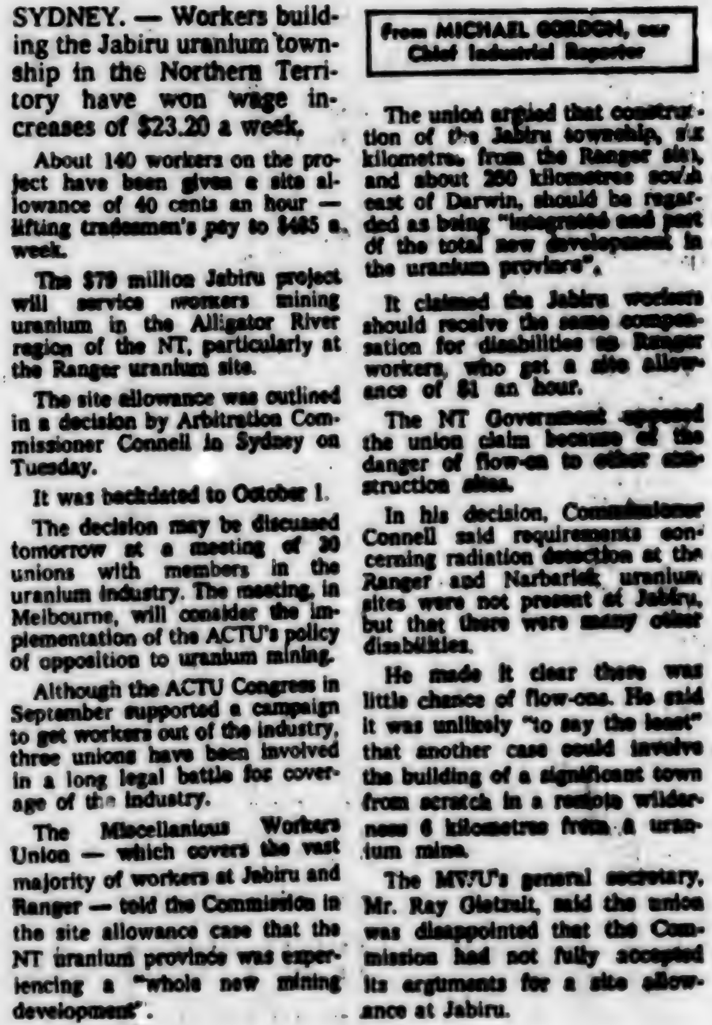
CSO: 5100

AUSTRALIA

WORKERS BUILDING URANIUM TOWNSHIP GET WAGE INCREASE

Melbourne THE AGE in English 29 Nov 79 p 15

[Text]



SYDNEY. — Workers building the Jabiru uranium township in the Northern Territory have won wage increases of $23.20 a week.

From MICHAEL GORDON, our Chief Industrial Reporter

About 140 workers on the project have been given a site allowance of 40 cents an hour — lifting tradesmen's pay to $485 a week.

The $79 million Jabiru project will service workers mining uranium in the Alligator River region of the NT, particularly at the Ranger uranium site.

The site allowance was outlined in a decision by Arbitration Commissioner Connell in Sydney on Tuesday.

It was backdated to October 1.

The decision may be discussed tomorrow at a meeting of 30 unions with members in the uranium industry. The meeting, in Melbourne, will consider the implementation of the ACTU's policy of opposition to uranium mining.

Although the ACTU Congress in September supported a campaign to get workers out of the industry, three unions have been involved in a long legal battle for coverage of the industry.

The Miscellanious Workers Union — which covers the vast majority of workers at Jabiru and Ranger — told the Commission in the site allowance case that the NT uranium province was experiencing a "whole new mining development".

The union argued that construction of the Jabiru township, six kilometres from the Ranger site, and about 250 kilometres south east of Darwin, should be regarded as being "integrated and part of the total new development in the uranium province".

It claimed the Jabiru workers should receive the same compensation for disabilities as Ranger workers, who get a site allowance of $1 an hour.

The NT Government opposed the union claim because of the danger of flow-on to other construction sites.

In his decision, Commissioner Connell said requirements concerning radiation detection at the Ranger and Narbarlek uranium sites were not present at Jabiru, but that there were many other disabilities.

He made it clear there was little chance of flow-ons. He said it was unlikely "to say the least" that another case could involve the building of a significant town from scratch in a remote wilderness 6 kilometres from a uranium mine.

The MWU's general secretary, Mr. Ray Gietzelt, said the union was disappointed that the Commission had not fully accepted its arguments for a site allowance at Jabiru.

CSO: 5100

BRIEFS

NABARLEK CONTROLLER PURCHASED--Kathleen Investments, controller of the Nabarlek uranium mine, will become a subsidiary of a company owned by Pioneer Concrete Services and Ampol Petroleum. The two groups have decided to pool their existing shareholdings in a new company and stand in the market for a month. The formation of a joint company will give the two groups a combined holding of about 51 per cent as Pioneer already holds 5.2 million shares and Ampol has 1 million. [Excerpt] [Melbourne THE AGE in English 29 Nov 79 p 25]

N-PLANT DELAY BID FAILS--The National Party yesterday failed in a bid to delay the establishment of a nuclear power plant in WA. The Opposition and the Government both opposed the move. The leader of the NP, Mr H. J. Cowan (Merredin) told the Legislative Assembly that nuclear power should be a last resort. Mr Cowan was supporting an earlier move by Mr M. E. Stephens (NP Stirling) for the Government to monitor and document scientific developments in nuclear power before going ahead with a power plant. Mr Stephens had attempted to amend a motion by Mr T. H. Jones (Lab., Collie) that planning for a WA nuclear plant should not go ahead. The amendment motion was lost 46-3. [Excerpts] [Perth THE WEST AUSTRALIAN in English 29 Nov 79 p 29]

NEW URANIUM MINE PLANNED--Brisbane.--Oilmin NL expected to bring one of its oil, gas, coal and uranium deposits into production in 1980, the chairman, Mr C. W. Siller, said yesterday. He told the annual meeting that in addition the level of exploration activity in both oil and mining would be increased. Mr Siller said the Adelaide-based Australian Mineral Development Laboratories had been engaged to prepare an environmental impact statement on the Beverley uranium project and previous feasibility studies were being revamped. An agreement via the Central Land Council had been reached on the monetary aspects of an agreement with the traditional aboriginal land owners of the Mereenie oil and gas field. Hopefully, the other apsects of the agreement would be finalised in the first quarter of next year. [Excerpt] [Sydney THE SYDNEY MORNING HERALD in English 28 Nov 79 p 30]

ALFVEN ON TITTERTON--A Nobel Prize-winning physicist, Professor Hannes Alfven, said on Friday he was shocked by outdated ideas about nuclear energy among Australian scientists and said atom bomb pioneer, Sir Ernese Titterton, did not know what was happening in nuclear research. The nuclear industry was trying to prevent development of alternative energy and was not going to allow its $100,000 million investment to go to waste. [Text] [Canberra THE WEEKEND AUSTRALIAN in English 8-9 Dec 79 p 3]

CSO: 5100

SCIENTISTS DEMORALIZED, REPORTS ATOMIC RESEARCH ASSOCIATION

Madras THE HINDU in English 17 Jan 80 p 6

[Text] New Delhi, Jan. 16. The Bhabha Atomic Research Centre Officers Association (BARCOA) says that BARC scientists are demoralised, alienated and are pessimistic about their future.

The association has alleged that BARC scientists "have been deprived of effective academic freedom and have to work in a state of constant fear of arbitrary authority."

A letter, which gives a glimpse of the plight of atomic scientists has been sent by BARCOA to the committee set up by the Department of Atomic Energy (DAE) to suggest reforms in its working.

The letter has assumed significance in the light of two suicides by DAE scientists, one two months ago at the Tuticorin heavy water plant and another yesterday at the Trombay complex.

The BARC officers have demanded a thorough review of the DAE workers. They have asked the department to remove the lid of secrecy and make it functioning more democratic.

According to the letter, "the working scientists are not aware of any plan that DAE has prepared for achieving whatever are the future requirements."

Transfer of power to the bureaucracy and centralisation of the decision--making process have "generated unprecedented resentment in the scientific community and played havoc with their morale and the performance of DAE.

The letter has charged that technically or economically unsound projects were initiated and continued for long periods of time.

"Several food irradiation projects, laser-induced uranium enrichment project and the Narora atomic power project are among the major examples of such projects."

According to the letter, the working atmosphere at BARC "inhibits frank scientific dialogues, breeds sycophancy, and encourages the quest for administrative power."

To improve future performance of DAE, the BARC officers have suggested democratisation of decision-making, restoration of the rule of law and a free and two-way information flow between the scientific community and the management with mutual accountability.

CSO: 5100

SCIENTIST DIES IN TROMBAY LABORATORY

Calcutta THE STATESMAN in English 17 Jan 80 p 9

[Text] Bombay, Jan. 16--Mr J. Ramakrishna (30), a scientist of the Bhabha atomic research centre, allegedly committed suicide in his laboratory at the Trombay complex here, police reported today, says PTI. Mr Ramakrishna, a biochemist in the biology and agriculture division of BARC, reportedly committed suicide yesterday by consuming a poisonous chemical. He was a bachelor and had been with BARC for six years.

He had been sent by BARC for higher studies abroad and had specialized in the photosynthesis phenomena.

BARC scientists are demoralized, alienated and are pessimistic about their future. The charge has been made by none other than the BARC officers association. Another scientist had committed suicide about two months at the Tuticorin heavy water complex.

The BARC officers in a letter to a reforms committee have demanded a thorough review of the working of the Department of Atomic Energy. They want the department to be more democratic in its functioning. "The working scientists (of BARC) are completely alienated from the management and feel in no way embarrassed when the department is publicly criticized," the letter says.

Many of the ills of BARC are the result of "keeping too many facts secret and confidential." The general secretary and the near-total absence of free exchange of information have kept BARC scientists and the people guessing about DAE's overall strategy. The association doubts DAE works to a strategy. "Certainly the working scientists are not aware of any plan that DAE has prepared for achieving whatever are our future requirements."

The BARC officers say transfer of power to the bureaucracy and centralization of the decision-making process have "generated unprecedented resentment in the scientific community and played havoc with their morale and the performance of DAE."

"In the name of secrecy they (the bureaucracy) have refused to be accountable to the scientific community not only in their treatment of the individual scientists but also in the decisions concerning the choice of projects."

The letter has charged that technically or economically unsound projects were initiated and continued for long periods. "The laser-induced uranium enrichment project and the Narora atomic power project are among the major examples," it cites. These and "innumerable scientifically unsound smaller projects lead to waste of scientists' time and national resources."

The letter says the working atmosphere at BARC "inhibits frank scientific dialogues, breeds sycophancy, and encourages the quest for administrative power."

To improve the performance of DAE, the BARC officers have suggested: (1) democratization of decision-making (2) "restoring" the "rule of law," and (3) a free and two-way information flow between scientific community and the management with mutual accountability.

CSO: 5100

ROK NUCLEAR SCIENTIST URGES FURTHER NUCLEAR ENERGY DEVELOPMENT

Seoul THE KOREA TIMES in English 30 Jan 80 p S1

[Article by Yang Dong-hee]

[Text] "Should the world's oil consumption continue to rise at the present annual rate of 7.5 percent, the world's petroleum deposits would be completely drained by the year 2000. Even before that happens, however, it is quite possible that the world would be constantly plagued by an abrupt unexpected oil supply shortage or a supply cut-off," says Dr. M. Gene Lim, president of the Westinghouse Nuclear Korea.

In an exclusive interview with The Korea Times yesterday, the nuclear expert expressed a serious worry over the global problem that nearly all of the existing energy sources, both fossil and oil, are bound to be used up in the foreseeable future.

Currently nearly one-half of the world's energy needs are met by petroleum and its deposits are estimated to be approximately two trillion barrels, according to Lim.

"Many countries are counting on energy sources such as wind, tidal waves or currents, terrestial heat, solar energy, nuclear fusion or fission, as alternative energy sources to replace the draining supply of fossil and oil energy. However, the wind, tidal waves or currents, and terrestial heat do not seem to be very much promising as dependable energy sources," he said.

Solar energy, he went on, can be utilized for only limited purposes such as hot water or residential heating and its application in massive power generation seems hardly feasible.

The strong advocate of nuclear energy asserted the utilization of the most ideal energy source--fusion energy--could not become possible before the end of this century considering the status of present technology.

"One must then conclude that the energy provided by fission nuclear power plants will play a key role in further economic expansion around the world," he observed, adding the economic disruption caused by OPEC pricing policies, the uncertain availability of other energy sources and the high costs make a compelling case for further nuclear development, especially for Korea.

Commenting on the risks of nuclear technology, he said no member of the public has ever been killed or injured as a result of the operation of nuclear power plants in the more than 20 years of commercial nuclear power plant operation around the world, despite the Three Mile Island accident last year.

He said the safety of nuclear power plants is a record unparalleled in modern industrial experience.

Asked to reveal any programs of the Westinghouse Nuclear Korea (WNK) to help the nation increase its localization ratio of nuclear power plants, Lim said introduction of nuclear technologies could bring about fatal and irrevocable results.

Major Japanese firms, Hitachi, Toshiba, Mitsubishi, joined in the nuclear industry 20 years ago and are now building a total annual manufacturing capacity of 20,000 MW of generating equipment.

Lim said the strong sense of competition and rivalry among the Japanese firms resulted in inefficient and unnecessary overlapping of research and development, and duplication of costly manufacturing facilities.

The difficulty in securing nuclear power plant sites and the global recession have caused considerable delay in nuclear power plant construction in Japan, and the Japanese nuclear industry has suffered a cumulative loss totalling 120 billion yen so far, he disclosed.

Lim started his nuclear career with a research work sponsored by U.S. Army Nuclear Defense Laboratory of the Defense Department, joined the Westinghouse Electric Corporation in 1965 and started more than ten commercial nuclear power plants in Japan.

He, promoted to the presidency of WNK last November from executive vice president of the company, got his M.S. in nuclear engineering at the Purdue University and Ph.D. at the University of Virginia.

CSO: 5100

GEC SUPPLIES TURBINE GENERATORS FOR KORI 2, 5-6th NUCLEAR PLANTS

Seoul THE KOREA TIMES in English 30 Jan 80 p S2

[Text]

GEC with sales of $6 billion and with 150 factories in Britain and 30 more overseas is the largest electrical and electronics company in the United Kingdom, among the largest in the world.

GEC Power Engineering Group, one of five major groups is responsible for power generation transmission and distribution equipment which is manufactured and sold throughout the world by its 10 subsidiary companies each specializing in a particular field. Based in the beautiful small town of Rugby, the actual birthplace of the rugby game, the group employ 25,000 people and achieve annual sales of around 880 million dollars, almost half for export.

Some of those companies are known through their activities in Korea over the last ten years. GEC Turbine Generators Ltd. supplied the turbine generator for the nations first nuclear power plant, Kori 1 and is also supplying the turbine generators for Kori 2 and the larger 1,000 mw units for the nations fifth and sixth nuclear power plants. The turbine company's first nuclear turbine generator started operation 18 years ago and already the company has accumulated 351 unit years of operating experience with nuclear turbines. These are installed with many different nuclear reactor types, from the first Magnox types installed in Britain to the prototype fast reactor. Units have been sold to Japan, India, Sweden, Canada and 1,300 MW units among the largest in the world have been sold to the U.S.A.

GEC Reactor Equipment Ltd. another company in the power engineering group is well known for its part in supplying the auxiliary nuclear systems for Kori 1. Apart from its major role in design and supply of equipment for the United Kingdom nuclear power programme, Reactor Equipment Ltd. have also done development work and supplied their specialist equipment to Germany, Italy, Romania, Belgium, Brazil, Japan, U.S.A., and many other countries.

Other Power Engineering Companies have played their part in Korea's nuclear power programme in supplying transformers, switchgear and auxiliary electrical equipment for Kori Units 1 and 2 also for Wolsung Nuclear Station.

Although this article has emphasized the nuclear application of GEC products, this is only part of the story. GEC Turbine Generators supplied the complete 300 MW oil burning power station for Yeosu Thermal Power Plant Unit 2, also 2—30 MW turbine generators now being commissioned for Honam Ethylene Company, diesel generators for multi-purpose cargo ships, high voltage switchgear and transformers for the 345KV transmission system, gear boxes for Korean Navy patrol boats and for other similar boats built for other navies by Korea.

In short GEC equipment is to be found worldwide in applications where reliability is important. This overriding factor is apparent in the excellence of the manufacturing facilities operated by GEC Power Engineering Group and in the dedication and skill of their employees.

* * *

Research and development activities of GEC are also very vigorous.

The central research facility for GEC is the Hirst Research Center at Wembley, which is one of the largest industrial research establishments in Europe, and over 10,000 scientists and engineers are employed by the group in research and development.

Almost all the development work takes place in the operating units but the company also has four other research establishments associated with GEC Power Engineering activities at Whetstone, Stafford and Trafford Park.

The company also offers its customers a wide range of training facilities to meet their particular needs.

Training may be arranged by means of a combination of formal courses for selected personnel at GEC offices factories, construction sites and training schools in the U.K. and at GEC construction sites and offices overseas, or by means of a combination on the job training of personnel to work alongside GEC personnel in the U.K. and on the construction site.

In addition, GEC operates the College of Management at Dunchurch, one of Europe's leading resources for management development.

Much has been written about nuclear power, and almost all the articles one reads deal primarily with the reactor, what type it is, how safe it is and how expensive it is. Very little is said about the turbine generator which is, after all, one of the most important elements of a power station, being the means of converting the steam produced by boilers into electrical energy for transmission and distribution to factories and homes. In a conventional power station these boilers burn coal, oil or gas. In a nuclear power station the nuclear steam supply system or boiler is fuelled with uranium. The purpose of the steam turbine is to convert the energy contained in high-pressure, high-temperature steam into rotating mechanical energy which can be used to drive an electrical generator.

A large steam turbine consists of a number of cylinders, or casings, each containing rows of stationary blades between which pass moving blades arranged in rows around the circumference of a rotating shaft. Passage of steam through the alternate rows of fixed and moving blading causes the shaft to rotate. The ends of the shafts of all the cylinders are coupled together and to the shaft of an electrical generator. In this way the energy contained in the steam can therefore be collected at the output of the generator in the form of electrical power.

Some facts and figures on the turbine generators being supplied for Korea's Nuclear Units Nos. 5 and 6 to be built at Kori may prove of interest. Each unit will generate 1,000,000 kw of electricity, the equivalent of the power produced by the engines of some 22,000 "Pony" cars. The turbine generators are 216 ft. long or about two thirds of the length of a soccer pitch, and have a total weight of over 3,500 tons. Each turbine has four cylinders, one high pressure and three low pressure. The rotating shafts or rotors in these cylinders turn at 30 revolutions per second, and the total weight of the turbine and generator rotors together is 740 tons.

Steam enters the turbine at a pressure of 914 pounds per square inch and at a temperature of 536F, and the rate of flow of this steam when the turbine is carrying full load is just over one and a half tons per second. As this steam passes through the turbine, from the high pressure inlet through the high pressure and low pressure cylinders, its expandinxg volume is accommodated by the progressively longer fixed and moving blades. The blades at the inlet to the high pressure cylinder are only four inches long whereas those at the outlet of the low pressure cylinders are nearly four feet long. These long blades are fixed to a wheel on the shaft, over seven feet in diameter, and since the wheel rotates at 30 revolutions per second, the tips of the blades are travelling at well above supersonic speed.

After leaving the last row of moving blades in the low pressure cylinder the steam passes into a large steel vessel known as a condenser. This vessel contains nests of small diameter tube through which cooling water is pumped. In coming into contact with the cold nests of tubes the steam condenses into water which is pumped back into the boiler or reactor to begin its journey over again.

The generator itself weighs 630 tons. The stationary windings are water-cooled and the core and rotor are cooled by hydrogen. If it were not for the use of these cooling media it would be quite impracticable to build and transport a machine with such a large output. Electricity is generated at 22,000 volts and this is increased to 345,000 volts in a transformer for transmission from the power station.

The steam turbine was patented in 1884 and, though the fundamental principles of operation have not changed, it has been gradually developed over the years into the highly complex and reliable piece of machinery that it is today. Though there are other means of generating electricity, by water turbines, by diesel engines, by gas turbines, by wind power, by solar power and by various other means which are as yet only research workers' dreams, the steam turbine is still the workhorse of the world for the generation of electricity.

CSO: 5100

SOUTH KOREA

ROK TO CREATE 44 NUCLEAR UNITS BY YEAR 2000

Seoul THE KOREA TIMES in English 30 Jan 80 p S3

[Text]

1. Outline

Korea has become the second nation in the Far East and 21st nation in the world entering the nuclear era by commissioning Kori nuclear unit 1 (587 MW) in April 1978.

Today, four nuclear power plants are under construction and a contract of purchasing major components for two additional plants is in progress.

Since indigenous energy resources are very poor in Korea, the Long-term Power Development Program has been projected so that the ratio of nuclear plants will be dominant in the long run. By the year of 2000, 44 nuclear units will be operated in Korea.

The nuclear business in Korea will be directed and managed, in fundamental principles, for reliable electricity supply, economic feasibility, self-supporting nuclear technology and localization improvement.

2. Nuclear Power Plants under Construction

A. Kori Nuclear Unit 2

Kori nuclear unit 2 is a two-loop Westinghouse PWR of 650 MW capacity, currently under construction adjacent to unit 1.

The concrete structures for reactor building and turbine building are in progress and as of the end 1978, 22.3% of scheduled works is completed.

This unit, expected to begin its commercial operation in December 1983, will be fueled with slightly (3%) enriched uranium as the unit 1, and one third of the core will be replaced with new fuels annually.

B. Wolseong Nuclear Unit 1

Unlike Kori nuclear units 1 and 2, natural uranium will be used as a fuel in Wolseong unit 1. This plant of 678.7 MW capacity is a CANDU-PHWR, designed by AECL. AECL, as a prime contractor, supplies reactor and its related facilities. Turbine and its auxiliary equipment will be supplied jointly by H. Parsons/C.A. Parsons. The electric equipment will be supplied by GEC of UK. Currently, the dome of reactor building is in progress. As of the end of 1978, 45.6% of the scheduled works is completed and it is expected that commercial operation will begin in April 1983.

C. Nuclear Units 5 and 6

Nuclear units 5 and 6 are scheduled as twin projects of 950MW PWRs. Contrary to the previous nuclear projects of turnkey contracts, these units will be implemented directly by KECO, therefore, more local business firms are expected to participate in the projects. The concept of non-turnkey project is as follows:

KECO hires an A/E for design and engineering and the contracts for purchasing major equipment such as NSSS, T/G and fuel fabrication are made in early stage of the projects. The remaining BOP is purchased as the detailed design is progressing.

Major Equipment

For nuclear units 5 and 6, KECO has hired Bechtel as a pre-project A/E and then through international bidding, Westinghouse was selected as a supplier of NSSS and nuclear fuel fabrication. GEC of UK was chosen as successful bidder for T/G.

The project management for these units is being done by KECO and in order to participate into engineering and purchasing of BOP equipment, KECO has already dispatched 10 engineers to Los Angeles, where KECO Liaison Office is open.

Meanwhile, many engineers from KNE (Korea Nuclear Engineering Co.) are participating in design and engineering in order to enhance their engineering capability so that they can take a part or whole of engineering for future nuclear projects.

The site for these units is Kori, and construction has started from January 1978. Unit 5 will be commissioned in September 1984 and unit 6 will be commissioned in September 1985, respectively. As of the end of 1978, 6.61% of scheduled works is completed.

3. Future Projects

A.Nuclear Units 7 and 8

Nuclear units 7 and 8 will be 900 MW class PWRs, same as units 5 and 6, and will be implemented as twin projects. The evaluation of bidders for supplying of major components is almost in final stage and negotiation for contracts will start shortly.

The construction works will be started during the first quarter of 1979 and units 7 and 8 will be commissioned in September 1985 and September 1986, respectively.

B. Nuclear Units 9 and 10

These units will also be implemented as twin projects. The major equipment will be purchased through international bidding and contracts will be made in 1979.

Pre-Project A/E

These units will be commissioned in September 1986 and September 1987, respectively.

C. Nuclear Units 11 and 12

Nuclear units 11 and 12 are also expected to be implemented as twin projects of 900 MW class and currently fundamental programs are under review.

Invitation for bid will be prepared during the third quarter. (Y.D.H.)

Outline of Nuclear Power Development Program ('70-'87)

Commissioning Year	Power Plants		Capacity (MW)	Reactor Type	Construction Schedule	Nuclear Ratio (%)	Site
1978	Kori	1	587	PWR	70.9—78.4	8.3	Kori
1983	Wolseong		687.7	PHWR	76.1—83.4	13.5	Wolseong
”	Kori	2	650	PWR	77.5—83.12	17.6	
1984	Nuclear	5	950	”	78.1—84.9	25.9	Kori
1985	”	6	950	”	78.1—85.9		Kori
”	”	7	900	”	79.1—85.9		Geam
1986	”	8	900	”	79.1—86.9	31.2	Geam
”	”	9	900	Not Decided	80.2—86.9		Undecided
1987	”	10	900	”	80.2—87.9		”

CSO: 5100

URANIUM PRODUCTION PROGRAM DISCUSSED

Zagreb VJESNIK in Serbo-Croatian 27 Dec 79 pp 1, 5

[Article by Zoran Gugic: "Uranium From Domestic Plants"]

[Text] In addition to the first and at present only uranium mine, located on Zirovski Vrh near Skofja Loka in Slovenia, Yugoslavia will in 2 or 3 years--by all appearances--have still another fairly rich source of uranium production, which will appreciably increase our stocks of nuclear fuel for power plants and nuclear raw materials for other purposes!

At Kutina, Sabac and Prahovo, and probably other places as well, as early as 1982 or 1983 we will be producing in special installations, alongside the fertilizer plants at those places, amounts that are not exactly negligible of uranium oxide (U_3O_8), referred to as "yellow cake," from which--thereafter--uranium is obtained by the subsequent processing procedure for use as a fuel in nuclear power plants or for other purposes.

200 Tons of "Yellow Cake" Annually

Uranium will be obtained by extraction from phosphate, that is, phosphoric acid, which incidentally is the principal raw material in production of certain types of manufactured fertilizers. Thus our annual output--at first--will be as much as between 150 and 200 tons of uranium oxide ("yellow cake"), which is appreciably more than the amount that will be obtained beginning in 1981 and 1982 from the uranium ore mine on Zirovski Vrh we have mentioned!

VJESNIK has been able to provide the first detailed reports of this undertaking which in the near future will have a considerable impact toward increasing Yugoslavia's raw materials base for the use of nuclear energy for generation of power and other (peaceful) purposes.

We have learned that a special meeting of a group of the Commission of the Federal Executive Council for Nuclear Energy will be devoted to that entire undertaking at the beginning of next year--probably on 9 January in Belgrade, this meeting to be held in the offices of the Federal Committee for Energy and Industry.

The meeting will be attended--in addition to representatives of the Federal Executive Council and certain other institutions--by distinguished specialists and scientists from the Yugoslav Community of Nuclear Institutes (the Boris Kidric Nuclear Science Institute in Vinca near Belgrade, the Rudjer Boskovic Institute in Zagreb, the Jozef Stefan Nuclear Institute in Ljubljana and the Institute for the Technology of Nuclear and Other Mineral Raw Materials in Belgrade).

Preparations Are Well Under Way ...

We have also been informed about certain other details related to those preparations for production of uranium from phosphoric acid in certain Yugoslav factories. "Uranium, that is, is present," we read in a document prepared for that meeting, "in small amounts in many phosphate rocks used as a raw material in the production of manufactured fertilizers and other phosphate materials. On the assumption that Yugoslavia processes in the manufacture of fertilizers more than 2 million tons of phosphate ore (1980) with an average content of between 0.1 and 0.2 kg of uranium per ton of phosphate, it follows that we could obtain as much as 200 tons of uranium annually by suitable separation procedures on an industrial scale!"

That is why the Yugoslav Community of Nuclear Institutes recently proposed to the Federal Executive Council, that is, to the Federal Commission for Nuclear Energy and the Federal Committee for Energy and Industry that work begin in our country to adopt our own technology for the production of uranium from phosphoric acid.

At the same time work on this has progressed fairly far at INA [Zagreb Petroleum Industry], so that we can already speak of preparations for the installation soon to be built for industrial production of uranium oxide from phosphoric acid in INA-Petrokemija, that is, at its fertilizer plant in Kutina.

We have obtained confirmation of this from Rade Pavlovic, graduate engineer and director general of the Community of Croatian Electric Power Organizations; Vladimir Lemic, graduate engineer and president of the business board of INA; and Milan Juraic, graduate engineer and director general of INA-Petrokemija in Kutina.

We also have obtained detailed reports from Stjepan Lisjak, graduate engineer and vice chairman of the business board of INA and its R&D director; he is actually in immediate charge of preparations for production of uranium from phosphate at INA installations.

Nine Predecessors

It was a bit less than 10 years ago that the world became aware of the possibility of obtaining uranium from phosphate rock, that is, from phosphate ore. Of course, in that short period of time the technology for that production has still not been altogether developed and refined in any country of the several working on it; Yugoslavia is actually one of the nine countries in the world preparing the production of uranium from phosphate.

Yet in several countries there are the first large industrial installations for production of uranium from phosphoric acid. They are in the United States (Florida and Utah) and in Canada--in all, eight plants which have begun to operate or will go into operation next year; in the People's Republic of China--according to certain information--there is a semi-industrial installation; work is being done on this in the USSR; and in Spain an installation with an output of 180 tons of uranium, that is, uranium oxide, annually is in preparation.

There is also a large installation in Israel, which has been working with particular intensity on this method of obtaining uranium; this is being done primarily for military reasons--production of nuclear weapons and so on.

The research has been completed at all these installations, but work is continuing to refine the technology, method and procedure for separation of uranium from phosphorus, that is, phosphoric acid. Japan has also begun to work on this: it has established a special consortium of the government, nuclear science institutes, industry and the electric power sector with the task of conducting research and preparations for developing their own technology for production of uranium from phosphate ores. Finally, the French also say that they have developed their own technology and processes for that production.

Yugoslavia, then, is one of the few virtual pioneers in researching (since in this matter we also--because of the specific nature of nuclear technology--are following our own independent road) a new method and a new source of obtaining uranium as a nuclear raw material.

INA Is Closer and Closer to Uranium ...

There are phosphate rocks at several points in our country, but in small amounts, except for somewhat more sizable and still inadequately explored deposits in southeastern Serbia, not far from Surdulica, near Vlasinsko Lake, and in the Krajiste area near Vardenik and Cemernik mountains, near a place called Gornja Lisina at the foot of a mountain of the same name.

The largest amounts of phosphates--on a world scale--are in North Africa, especially Morocco and Algeria, and then in Mauritania, and then in Senegal, Gabon, and then again in Jordan, Israel, Syria, the United States, and huge amounts in the USSR and China. The average uranium content in the world's deposits--as we have said--is between 100 and 200 grams per ton of phosphate, and that is also the content of the phosphates which Yugoslavia imports for its fertilizer industry.

In the preparations for use of these phosphates and for production of uranium from them the farthest progress has been made in INA, where work has been done on this for 2.5 years now: from assembly of the literature and the first reports on this potential sent to the competent bodies in Yugoslavia to the project planning of an industrial installation.

So far all of this has been financed, we were told by Engineer Stjepan Lisjak in an exclusive interview with VJESNIK, by INA itself, that is, by the work organizations INA-Naftaplin and INA-Petrokemija, but the Community of Croatian Electric Power Organizations and the Self-Managed Special-Interest Community of Croatian Electric Power Consumers, as well as the Krsko Nuclear Power Plant have announced that they will enter into this undertaking. Considerable amounts of money have been spent--with excellent results--in addition to the work of numerous specialists, researchers and scientists at the highest level.

So far all the research and preparations have been based on extraction from commercial phosphoric acid which beginning in 1981 will be produced at the new plant that is being built as part of Phase 2 of INA-Petrokemija in Kutina alongside the present huge fertilizer plant.

"Yugoslav Method"

The purpose of all these efforts is to arrive at our own technology for production of uranium, that is, uranium oxide (U_3O_8 or "yellow cake") from phosphoric acid, which is also produced in our factories, with our own resources and technology. All this is being done because the countries which already possess their own technology for this process are offering that technology, but under the condition that we pay them for it with delivery of uranium oxide from our plants, deliveries that would be made for an "unlimited number of years"!

Of course, it still has not been possible to altogether avoid contacts with certain foreign firms which are ready to collaborate with us on the basis of the guarantee that they will not require payment and services in return in the form of our deliveries of "yellow cake."

The phase of experimental production of uranium in "expanded laboratory conditions of extraction, done in the form of several continuous tests" has now been completed. The essence of the Yugoslav method is that the phosphoric acid goes through certain devices in which the uranium contained in that phosphoric acid is extracted by a special liquid and is itself extracted in the form of a liquid which is thereafter transformed by a process into "yellow cakes," that is, into solid uranium oxide.

This uranium oxide is the raw material for production of nuclear fuel. This phase--production of uranium nuclear fuel from "yellow cake"--is now being prepared as part of the Yugoslav Nuclear Program by means of future construction of our own industrial plant in Yugoslavia to obtain nuclear fuel. This will also solve all other related problems, such as enrichment of uranium for immediate use and the like.

Success, then, has been achieved in "organizing under expanded laboratory conditions the production, that is, extraction, of uranium oxide from phosphoric acid according to our own process and procedure." The second phase immediately began, i.e., experiments have been conducted to find which phosphates in the world are both most suitable for the production of phosphoric acid and also have as high uranium content as possible for its extraction from the phosphoric acid obtained from the phosphate. On this basis we will decide on the phosphate ore or phosphates we will import.

Nuclear Fuel From Phosphate

When we complete this research as well in the near future, we will build a semi-industrial plant which will furnish sufficient elements for our own design and independent construction of an industrial plant for uranium extraction or several such installations or plants alongside the existing fertilizer plants at Kutina (as part of Phase 2, which is now under construction), Prahovo and Sabac.

It is estimated that we will thereby have sufficient elements for construction of the first such industrial plant when Phase 2 of INA-Petrokemija in Kutina is completed, which will be in 1981 or 1982.

At present phosphoric acid is being produced from phosphate at the plant of the Chemical Products Industry in Prahovo (on the bank of the Danube) as part of the Bor Mining and Smelting Basin, and then at Zorka Chemical Industry in Sabac, the Veles Chemical Industry (HIV) in Titov Veles, and FAFOS--phosphate plant of the OOUR [Basic Organization of Associated Labor] Chemical Industry of the Trepca Mining, Metallurgical and Chemical Combine in Kosovska Mitrovica.

It is possible at all these plants to build installations or plants for production of uranium oxide. At present it is most likely that the first Yugoslav plant for production of uranium from phosphoric acid will go into operation before 1982 at INA-Petrokemija in Kutina. Initial production at these plants will be--it is estimated--150 tons of uranium oxide annually.

This is sufficient for the production--along with other things--of enough nuclear fuel for several nuclear power plants such as the one at Krsko.

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NATION'S ENTRY IN LONDON CLUB REAL POSSIBILITY IN 1980

Buenos Aires CONFIRMADO in Spanish 20 Dec 79 p 9

[Article: "Argentina Joins the Club"]

[Text] The last meeting of the International Atomic Energy Agency (IAEA) allowed Argentina to reassert its intentions to join the group of nuclear powers.

Maybe in a short time--perhaps in 1980--Argentina will become the first Latin American country to join the so-called London Club, made up to date by the United States, the Soviet Union, France, England, India and Germany. This international organization comprises those countries that are able to transfer nuclear technology on an international basis.

This speculation is not so far-fetched when one considers that Argentina is the atomic leader in Latin America, with an activity in this field that dates to 1945, the very beginning of the "nuclear era." On the other hand, the National Atomic Energy Commission (CNEA) has signed assistance agreements with practically every country in the region and already has even made exports, such as the zero-power reactor that it installed in Peru. The progress of Buenos Aires continues and the signing of an agreement with Itamaraty is anticipated, a decision that would entail a shift in Brazil's policy on the matter because it would tend toward the use of power plants based on natural uranium. This supposed decision would put an end to the semidefunct German-Brazilian complementary agreement (based on enriched uranium) that has been causing so many headaches to the two countries.

A few days ago, the chairman of the CNEA, Rear Adm (to be promoted to vice admiral) Carlos Castro Madero, reasserted at the annual meeting of the IAEA the determination to promote and implement the proposed projects despite the pressures exerted from abroad to influence the National Program. To corroborate such a stand, Argentina submitted its resignation from the ordinary program of technical assistance of the organization at the meeting held in New Delhi.

The reasons that the country adduced were very clear: the cooperation of the IAEA had gradually diminished during the past few years. As Castro Madero pointed out to CONFIRMADO, "this fact cannot be attributed to lack of action on our part nor to the unwillingness of the officials of the IAEA." What is really happening is that the countries which provide the technology significantly restrict their cooperation in the areas related to the development of a strong independent nuclear industry. Therefore, the assistance that can be received does not attain a level that is adequate for our needs in the fields of nuclear engineering and technology.

The CNEA official asserts in that respect that "we believe it is unfair to tax the meager resources which normally are allocated to technical assistance with requirements that do not fulfill our desires."

The future battle

Although this trip of Castro Matero includes India and Germany, the Argentine admiral will hold interviews only with the German authorities. No talks will be initiated with experts of the Indian research centers. It must be kept in mind that India was the last member to join the London Club and the only one of the so-called "developing countries" belonging to that staff. It is averred that Argentina has a technological development superior to that of India, despite its lack of the atomic bomb.

Upon his return (scheduled for the 23d), Castro Madero will continue his monthly inspections of the nuclear power plant of the Tercero River Reservoir, Cordoba, a work which he took under his personal care and plans to complete before the deadline (initially, March 1982). But this is the task of the conclusion of a stage--the most difficult--regarding the construction of the first two power plants, attempting to progressively diminish foreign participation.

After the awarding of ATUCHA II to a German enterprise and the construction of a heavy water plant to a Swiss private company, studies must be undertaken for the auctioning off of another three generating plants that would go into operation in 1991, 1994-95 and 1997, respectively. As it transpired, although there is no official confirmation, the first two plants will be located in Mendoza and the other in some province of the Northwest.

Surely, an avalanche of proposals, pressures and speculations will start as soon as the preliminary process of the auction gets underway. As will be remembered, it was expected that the CNEA would contract for the whole nuclear program at the time that the construction of ATUCHA II was awarded. But the Argentine authorities decided to postpone the final decision in order to get a better deal in the bidding.

The international independence that Argentina is seeking and the confirmation of the regional leadership will try to assert themselves in the next meeting that the IAEA will hold outside of Geneva in 4 years. Argentine representatives requested of the organization that Buenos Aires be the site of that meeting. Should this proposal be accepted, the country would be recognized as the seventh nuclear power of the Earth within a short time.

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CSO: 5100

CASTRO MADERO TERMS ACCORD WITH BRAZIL 'VERY IMPORTANT'

Buenos Aires LA PRENSA in Spanish 31 Dec 79 p 6

[Article: "Agreement With Brazil and Atomic Wastes"]

[Text] Responding to questions by journalists, Vice Adm Carlos Castro Madero confirmed plans for a cooperation agreement with Brazil, but totally rejected reports that Argentina would accept disposing atomic wastes from Switzerland.

The agreement with Brazil is regarded as "very important," despite the fact that the methods to achieve independence in the nuclear field are different in both countries, as in the nuclear power plants, since the former nation uses enriched uranium, while Argentina uses natural uranium. He stated that he will soon make a visit to Brazil to reach agreement on matters to be drafted in the agreement. When asked to be more specific, he mentioned basic research, examination of guidelines for the implementation of important programs in this field, study of reactors for the future, and quality control systems.

With respect to the international situation he pointed out that the intention of highly-developed countries is to prevent another nation from attaining the complete nuclear fuel cycle, which Argentina is on the point of achieving.

In this respect he stated that negotiations for the installation of a heavy water plant is continuing normally, and it is expected that the agreement will be completed by the middle of next January.

Technical Assistance

In connection with the rejection of technical assistance from the International Atomic Energy Agency (IAEA), he stated that in no way does this mean that Argentina has dissociated itself from that agency, only that Argentina has moved beyond the level of assistance its program offers and, therefore, it has been decided to leave the way open for other nations to make use of it.

He added that the CNEA [National Atomic Energy Commission] would be interested in another type of technical assistance which the highly-developed countries could provide, but he noted that in such cases other economic interests come into play.

Reviewing the IAEA requirements for technical assistance he emphasized that it is provided from a fund of voluntary contributions by member countries, but that the program is being used to insist on demands set by the treaty for the nonproliferation of nuclear weapons, which Argentina still has not signed and does not intend to subscribe to.

He remarked immediately that Argentina continues to be an active member of the IAEA and, as an example, stated that the country heads two programs in Latin America--in Guatemala and Bolivia--, provides experts to the IAEA for various committees and has met 100 percent of its voluntary contribution for technical assistance.

New Nuclear Plants

Regarding when energy-producing nuclear plants, under construction or approved for construction, will begin functioning, he stated that the plant in Embalse, Cordoba, will be completed in 1982; Atucha II, in 1987; and of the three remaining, one in 1981, another in 1994 and 1995, and the last one in 1997.

Nuclear Wastes

When he went on more deeply into the matter of the elimination or control of atomic residues, and he noted that serious problems exist in Europe in this respect, Vice Adm Castro Madero declared: "I would say that we have no problems because that is one of the advantages of using natural uranium. The greatest problems arise during the reprocessing by enriched uranium.

"Furthermore," he added, "Argentina still does not have, nor will it have in the immediate future, a large quantity of waste fuel elements. For the moment they are stored in the existing pools for that purpose in Atucha, and another such pool is under construction."

He reiterated immediately that residues from the nuclear plants in Switzerland will not be accepted.

Sudatom

Regarding the possibility of setting up an organism made up by the countries of South America, which could be called Sudatom--like the one existing in Europe, Euratom--he said that it is still very premature to think of something like that and he stated that various plans for cooperation are already in motion between Argentina, Chile, Ecuador, Peru and Venezuela.

Finally, he noted that the assembling process being undertaken by the CNEA in the Embalse nuclear plant, of high precision systems, like those of reactivity, the calandria--a type of boiler of unique design which contains the fuel elements--and the transference of zircaloy tubes, demand a high degree of competence from Argentine technicians, whose meritorious work he emphasized.

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CSO: 5100

ARGENTINA

NUCLEAR THEME TO HIGHLIGHT VIDELA-FIGUEIREDO VISIT

Buenos Aires CONVICCION in Spanish 22 Dec 79 p 11

[Article: "Nuclear Cooperation and Mining Exploitation Are Themes for Videla and Figueiredo"]

[Text] A treaty of nuclear cooperation, joint exploitation of the iron ore mines of Urucum in the Mato Grosso area, and the agreement for Argentina to sell gas to Brazil are three themes defined on the agenda which President Joao Figueiredo is preparing for his visit to Buenos Aires next March.

The reserve among government sources which are preparing the presidential agenda was not broken except through isolated reports related to the probable themes which Figueiredo will discuss with the Argentine President, Jorge Rafael Videla.

The certainty with regard to the March date, emerged from the statement by Brazilian Minister of Foreign Affairs Ramiro Saraiva Guerreiro to the effect that President Figueiredo could not leave his country without the agreement of Congress, which is in recess until 1 March.

The agreement for the sale of Argentine gas was confirmed as having been included in the agenda at the time of the recent visit to Buenos Aires by the Minister of Finance, Karlos Rischbieter, as a result of the offer made by the Argentine Minister of Economy, Jose A. Martinez de Hoz. Regarding the gas, the Minister of Foreign Affairs revealed that the matter had been touched on lightly in the meeting which he had with the Argentine Minister of Foreign Relations, Carlos Washington Pastor, in Puerto Stroessner, on the occasion of the signature of the agreement on the harmonization of Corpus and Itaipu dams.

The Brazilian Minister of Foreign Affairs said that the purchase of Argentine gas by Brazil does not jeopardize the agreement signed with Bolivia, which has not yet been put into effect as a result of opposition in Bolivian political circles, which stated that the fuel must be used to establish the bases for an industrial scheme in the country, and not sold abroad.

The month of January will be decisive for the preparation of the agenda and the completion of the gas accords, but also in the context of the nuclear cooperation treaty.

In that month a team of Argentine technicians from the State Gas Enterprise will arrive in Brazil, and there will be a visit of the President of the National Commission of Atomic Energy, Vice Admiral Carlos Castro Madero.

During that visit Castro Madero will examine "the possible areas for nuclear cooperation," according to information released today by diplomatic sources.

The trip by the Argentine Vice Admiral is considered to be the beginning of the process which should conclude with the Treaty of Nuclear Cooperation between Argentina and Brazil, to be signed in Buenos Aires in March.

The Brazilian press today reported recent statements of Castro Madero, in which he said that, "the two countries have common objectives, and that although they are seeking to develop an independent nuclear program, each with its line of focus, both are aiming for the same objectives."

Castro Madero was invited to visit Brazil before the end of 1979 by the President of "Nuclebras" [Brazilian Nuclear Corporations], Paulo Nogueira Baptista, but the Argentine expert postponed the visit for a month, citing his lack of time in December.

Another item on the agenda of President Figueiredo, still in the drafting stages, is the joint exploitation of the iron ore and manganese reserves in Urucum, in the State of Mato Grosso.

This subject was brought to Buenos Aires by Minister of Finance Rischbieter, and the initial Brazilian proposal was that the Urucum enterprise would have a minimum of Argentine capital, in relation to the investment requirements by the industry in Argentina.

Urucum has a reserve of almost 1 million tons, and accessible waterways make the product commercially viable.

The mineral product of Urucum was shipped for several years to Argentina when the mine was operated by United Steel, which established a system of barges which operated between the two countries for only 4 months of the year, due to problems of navigation.

At present Urucum is under the control of "Docegel," a subsidiary enterprise of the state enterprise "Vale do Rio Doce," which, 2 years ago, offered Argentina the construction of a special ship to transport the iron ore.

According to that plan, which now may be realized, the ship would be of 270,000 tons, gross weight, and would be scheduled to carry ore and wheat to the Middle East and return with petroleum, lowering the freight charges by almost 50 percent.

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CSO: 5100

REPROCESSING PLANT INSTALLATION IN SANTA CATARINA PROTESTED

Protest March

Sao Paulo FOLHA DE SAO PAULO in Portuguese 17 Dec 79 p 4

[Text] Aracruz--About 2,000 persons, a much smaller number than had been anticipated, went yesterday to the municipality of Aracruz, 95 kilometers from Vitoria, to protest the installation of a uranium reprocessing plant in Espirito Santo. The caravan, called the "Ecological March," left Vitoria at 0800 hours and arrived there around 1000 hours. According to one of the organizers of the movement, Deputy Dilson Lirio Neto of the Brazilian Democratic Movement (MDB), the movement against the installation of the nuclear plant is going to continue "despite the people's lack of interest," being directed now at the neighborhoods and the rank-and-file communities of the Church so as "not to deflate the protest movement."

Contrary to announcements, no technician attended the public ceremony. The speeches that were supposed to be delivered by ecologists Paulo Fraga and Augusto Ruschi were replaced, to the applause of the crowd, by speeches by 15 political leaders from the area connected with the preservation of the environment, among them MDB Deputy Max Mauro.

No Incident

The march was held without any incident and under the vigilance of the local police. In the meantime, the Federal Highway Police cooperated in the holding of the public demonstration by providing escorts to protect the caravan of cars and buses that were traveling to Aracruz.

Members of the Espirito Santo Anti-Nuclear Committee approved a proposal at the demonstration site to keep the organization detached from the "influence of the politicians so that the movement may not become a means of vote-hunting."

Only 10 buses, hired by the organizers, arrived at Aracruz carrying demonstrators, who ended up by taking advantage of the occasion to protest also against "hunger and social injustice" in Espirito Santo. For the organizers of the "Ecological March," the first gathering held in Vitoria, and drawing more than 1,000 persons, achieved more immediate objectives, but they explained that the lack of transportation, the price of gasoline and the continuity of public demonstrations, that have been held for a month must have influenced the "small turnout" in Aracruz.

Movement

The state's antinuclear movement began after the announcement last November of the possibility of the federal government establishing nuclear units in Espirito Santo. However, it became intensified after it was ascertained that Brazilian Nuclear Corporation (NUCLEBRAS) technicians were working in the area of Aracruz, in the northern part of the state. The public demonstration held on 28 November 1979 in Square 8 in the center of Vitoria showed, according to the organizers, "that there is unanimity in the demonstrations of protests against the plants."

Governor Eurico Rezende himself supported the demonstrations at the time, however, he said that he did not agree with the "political aspect of the matter." The presence of politicians at those demonstrations began when the press revealed the first reports that NUCLEBRAS technicians were in Aracruz drilling the ground for the subsequent installation of the nuclear plant. Senator Dirceu Cardoso (MDB), for example, has been the most unfortunate of politicians; students prevented him from speaking during the first public demonstration against the plants despite the fact that the senator is one of the members of the Senate congressional investigating committee that is studying the Brazilian-German nuclear agreement.

On 19 November 1979, the Espirito Santo ecologist Paulo Fraga declared in the legislative assembly that "those who deal with nature know that nuclear energy is not the cleanest and cheapest energy at the disposal of man, as proclaimed by those who have an interest in the proliferation of megaloprojects of nuclear plants in Brazil."

Nuclear Bomb Speculation

Sao Paulo FOLHA DE SAO PAULO in Portuguese 16 Dec 79 p 22

[Article by Carlos Alberto Luppi]

[Text] The Brazilian atomic bomb could be in the process of being born secretly in the state of Espirito Santo less than 14 kilometers from the seacoast, 95 kilometers from Vitoria, the capital; in the small town of Baiacu, near the almost deserted coarse sand and palm-covered beaches of Santa Cruz, a district founded 400 years ago; almost near the arm of the sea that forms the legendary salt water Piraqueacu River, full of oysters, various species of crabs, shrimp, turtles and fish of all kinds; also very close to a tribe of 600 pure Guarani indians living on land granted by Dom Pedro II who have bravely resisted the pressures of the multinationals.

NUCLEBRAS has arrived there, where people get up with the sun and go to bed at 8 o'clock at night, without television, radio, newspapers, and considered one of the richest and most bountiful fishing areas in the country, arousing the comments of the oldsters and the raft and boat fishermen and at the bars where they gather for white rum at the end of the day. Today the Brazilian state enterprise is already carrying out the preliminary work of soundings and soil and subsoil investigations in an area of 12,400 square meters. And that has been going on for over a year, with greater intensity in the last 4 months.

Of course, there was no official announcement and any notice. The Brazilian state enterprise contracted the services of the Tecnosolo and Miguel Carlos companies through the NUCLEBRAS Monazite and Associated Elements Ltd (NUCLEMON) and went in there quietly "without asking permission," as the comments say, drilling the ground in search of two things: Rocky formations and salt mines.

The former, in order that it may be possible to support a uranium reprocessing plant in that site; in the final analysis, a plant whose basic product and its byproduct can very well be utilized in the building of nuclear devices and atomic bombs, as has already been done by six countries throughout the world. And the salt mines to serve as a dump 700 to 800 meters deep for the so-called "atomic waste."

Four months after the investigations and soundings that occupied more than 100 persons during that period, NUCLEBRAS has already achieved its first basic objective in Baiacu: It located a continuous and highly resistant rocky formation in an area of over 5,000 square meters beginning 15 meters below the subsoil and drilled to a depth of 85 meters vertically and 110 meters diagonally. That is, NUCLEBRAS has already found there--"in that veritable paradise," as a local resident termed it--the ideal geological conditions for the installation of a uranium reprocessing plant; conditions "infinitely better than we had imagined," as one technician in the area let slip out; thousands of times better than the geological sites where the foundations of the Angra dos Reis nuclear plants are being installed, which are considered fragile.

As for the second objective, the salt mines, indications are practically nonexistent. But NUCLEBRAS already knows that 20 kilometers from there, in Santa Rosa, and 130 kilometers in a northerly direction in the state, in Sao Mateus, on the coast--in the Suroaca--there are abundant salt mines at a depth of 500, 600, and 700 meters. It now wants to see if those mines extend under the subsoil up to Baiacu, "which appears improbable," according to the same indiscreet but conscientious technician. "If you put my name in the paper I will be fired and then I will be forced to look you up in Sao Paulo to find me a job," he said. If investigations indicate the existence of salt mines in Baiacu, NUCLEBRAS will have no doubts about installing an "atomic waste" dump there.

Project ES-119

This plant is known in the technical circles of NUCLEBRAS and its subsidiary NUCLEMON as Project ES-119, an apparently innocuous code number used by the technicians in the area and in Vitoria in their communications with the headquarters of the state enterprise in Rio, by telephone, pouch and mail, to hide their real purposes. There is no mention of a "nuclear project," but there is a lot of talk about Project ES-119.

In the investigations and soundings, the technicians first found water at a depth of 5 or 6 meters, then clay, then sand. Everything was duly noted in the "rotary or mixed sounding bulletins" of Tecnosolo, some of whose machinery was even damaged in drilling through the rock, which appears after 15 meters in certain places and 20.22 meters in others. In the rock, the technicians insert another apparatus capable of extracting a compact 60-centimeter core which is then forwarded for examination far from there, in Vitoria.

An attempt is being made to maintain secrecy over this project by any means and NUCLEMON has gone to the extreme of contacting people from the place to advise the technicians when any reporter comes there. On those occasions, geologist Roque and engineer Paulo leave the site and stay at a distance in Nova Almeida where all the technicians get together at night over maps, figures and varied codification.

In the area where the work is being carried out, each of the owners of the three properties included in the soundings--Paulo da Penha Miranda, Niracy Nunes Machado and Lourival Borges Banhos--have already signed a document entitled "Authorization" and signed by NUCLEMON stating: "I authorize NUCLEMON to carry out mineral prospecting and investigation work in the land which I own in the town of Baiacu in the municipality of Aracruz."

A few residents in the neighborhood have already taken cognizance of the fact that a nuclear plant is going to be installed in that site but very few have a real awareness of what that means. Baiacu remains the same town as always, almost indifferent to what is being started there. There are few houses in the area and the land generally continues to be used for pasture or planting. Access to the area where NUCLEBRAS is carrying out its prospecting is gained by a narrow road between an eucalyptus grove, emerging in a vast land depression.

Engineer Paulo explains the work there: "We are carrying out geotechnical work. Five bores have been made in the land and I believe that all of that is for the construction of a building here." He does not mention anything else. But the fact is that a total of 12 bores have already been made and in several of them "the work has been completed," according to the official, Raimundo. And he adds: "We looked for rock here and we found veritable mountains of rock here, all of it compact without fragmentation."

Now, having more concrete data, NUCLEBRAS, as of 1980 is beginning to expropriate the site for a total of 29 alqueires [land measure varying from 242 to 484 ares]. The wife of Paulo da Penha Miranda, one of the owners of the area relates that "that company came here and began to detonate explosives in various places in the subsoil. Then they began drilling work. When I asked what was going on they said that it was to measure solar energy." Tecnosolo has already notified the landowners in the area that they will be indemnified within the next few months.

The doubts that could have existed until a few days ago were recently dissipated. The president of the Brazilian Electric Power Corporation (ELETROBRAS), Mauricio Schulman, himself, when he was in Vitoria at the end of November, confirmed the studies for the installation of the nuclear plant in Espirito Santo, in Baiacu, adding that there were still determinations to be made."

Furthermore, an official note of the Espirito Santo government implicitly admitted that the object of the investigations was to facilitate the construction of a uranium reprocessing plant in the state. The note came out after a meeting between Governor Eurico Rezende and the president of NUCLEBRAS, Paulo Nogueira Batista in Rio.

Another more concrete piece of information was obtained from engineer Paulo Melo of the Jones dos Santos Neves Foundation: "Aracruz, the municipality in which Baiacu is located was selected 3 years ago by NUCLEBRAS as the site for a nuclear installation. The geological and hydrographic surveys--the latter pertaining to Piraqueacu River--have already been concluded and according to information obtained from NUCLEBRAS technicians, according to the company's schedule, grading work in the area could begin within a few more months."

But that is not all, NUCLEBRAS knows very well that extensive areas of heavy sands occur throughout the whole coastal strip in Espirito Santo: Rutile, ilmenite, zirconite, monazite--minerals that find a wide foreign market and which could be industrialized in the state. It knows also that there are granitic-gneissic rocks where it is possible to find kaolin, feldspar, beryl, cesium and rubidium. That is, in all aspects, Espirito Santo is a highly strategic state for NUCLEBRAS, as it was possible to hear from conversations between technicians in the Baiacu area who were eating a crab dish in the Iraja Restaurant near the beach in Santa Cruz. One of them said sarcastically: "I hope the animals do not suffer," referring to the crab.

Outside, the owner of one of the rafts there exclaimed: "Nobody ever talked about this place. This has been here for 400 years and nobody ever concerned himself about the region. Now, they are coming here?"

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CORRESPONDENT REPORTS ON AE CONFERENCE IN NEW DELHI

London WEST AFRICA in English 14 Jan 80 pp 60-62

[Article by Hari Sharan: "Nuclear Proliferation and West Africa"]

[Text] AT THE twenty-third general conference of the International Atomic Energy Agency (IAEA) held in New Delhi from December 4 to 11, only 14 African countries sent their delegations. Statistically speaking, out of the IAEA membership of 110, 25 member states come from the African continent, which embraces 48 independent countries. Nigeria, Ghana, Senegal, Niger, Gabon and Zaire were the only West African countries attending the New Delhi conference.

From the African point of view the conference started with a bang: South Africa was banned from participating in the conference. The initiative was taken by Nigeria, which challenged the credentials of South Africa, the contention being that the present government in Pretoria did not represent the people of that country. In the credentials committee seven members, namely, Nigeria, India, Qatar, USSR, Tunisia, Malaysia and Czechoslovakia, voted for barring South Africa from the conference, while six countries, the US, UK, France, Germany, Canada and Japan, opposed the move. Ecuador had earlier abstained but later in the conference voted for the Nigerian move. At the general conference South Africa was ousted by 49 to 24 votes.

It was interesting that most of the countries pleading for South African participation in the conference tried to make it clear that they had been opposing the policy of apartheid. This led the Kenyan delegate to exhort them to let their actions speak for their words. "Please act, if you are opposed to apartheid," he thundered.

South Africa, with two nuclear power stations, is considered a near nuclear power, but it is noteworthy that nuclear technology in other African countries is far behind as compared with a developing country like India. The peaceful application of atomic energy in fields like agriculture, nuclear medicine, etc., is making only a slow headway. Egypt, Libya, Algeria, Ghana and Nigeria are perhaps the only African countries which are going ahead with peaceful uses of atomic energy in a systematic manner. Egypt and Libya are seriously involved in feasibility studies for putting up nuclear power stations.

Niger and Gabon, known for their rich deposits of uranium (much lower than South Africa and Namibia though), were treated with much respect at the conference, even though the contribution by their delegates was not distinguished. Now that countries like Somalia, Central African Republic, Zambia, Nigeria and Egypt have begun mining uranium, Africa's share of world uranium resources may go up to 40 per cent, as compared to its present 25 per cent. It remains to be seen how Africa is going to use its resources of this precious metal for the welfare of its people in the coming years, but the general impression is that the acquisition of nuclear technology by most of the African countries is not given high priority so far.

Yet, with the hope of getting a bigger share of assistance [illegible] IAEA in the field of agricult[illegible] research and fellowships, a num[illegible] countries have signed the Non-P[illegible]eration Treaty

(NPT). They, however, all realise that the treaty is discriminatory in favour of the nuclear powers. As of September, 1979, the IAEA had negotiated NPT signatures with over 20 African countries, notably Nigeria, Ghana, Senegal, Liberia, Gabon, Zaire, Kenya, Ethiopia, Sudan, Libya and Morocco. Prominent among the African non-signatories to NPT are Egypt, Algeria, Zambia and Tanzania. India has also not signed.

Tanzania and Zambia joined other developing countries in voicing serious misgivings about the future of the NPT. Supporting India's stand, the Tanzanian delegate told the IAEA that adherence to NPT held no advantage to the non-nuclear weapon countries. NPT was discriminatory and served the interests of the few haves. Tanzania alleged that the nuclear power states were increasingly engaged in a fierce arms race and maintaining their vast stockpiles of nuclear weapons. At the same time the strong advocates of NPT had tried to use every opportunity to insist on non-nuclear states not acquiring nuclear technology even for peaceful purposes. By saying so, the Tanzanian delegate debunked the nuclear powers who keep on saying that they were sympathetic to countries needing nuclear power for development but were worried about nuclear weapons proliferation.

Even though a signatory to NPT, the Nigerian delegate felt constrained to question the idea of imposing the NPT system on member states and thus driving them to the point of missing the technological revolution, just as they had been by-passed by the industrial revolution earlier. "We of the developing nations are watching warily the nuclear powers' sledgehammer method of dealing with us in regard to nuclear technology. All sorts of measures have been introduced to deprive the developing nations of the extensive use of sensitive nuclear technology, so that it will not spread beyond the few who are already having it, thereby establishing a stranglehold over the Third World nuclear market."

The Nigerian delegate made a scathing attack on the transfer of nuclear technology to the apostles of apartheid in South Africa. "Are we, the developing countries of Africa, supposed to sit down as helpless onlookers with the latest news of nuclear explosion in South Africa?" he asked.

Surprisingly enough, the Nigerian delegate did not mention the threat of nuclear proliferation from Israel, nor the reported collaboration between Israel and South Africa in this field. But the Libyan delegate drew the attention of the conference to the reports about Israeli and South African activities to produce and develop nuclear weapons. He, however, made no mention of the long-rumoured collaboration between Libya and Pakistan in producing an Islamic bomb. Nor did he say anything about the reports that Libya had hijacked a 20-ton uranium-loaded truck, the mineral having later reached Pakistan.

Libya also talked of exchanging oil and nuclear technology. "The oil-producing countries have done so far everything possible and they are ready to help the developed countries overcome their energy problems. We do expect that the developed countries would reciprocate to that co-operative spirit by making nuclear technology equally available to the developing countries," the Libyan delegate said.

As to the conference itself, the African countries, along with other members of the Group of 77, were involved in two approaches to the developed world, but the latter had the final say in both the matters. The Group of 77 had tried hard to get funds for technnical assistance from the regular budget instead of from voluntary contributions, but had to be content with a resolution urging the board of governors of IAEA to examine all possible means of attaining that objective.

The lions share of the 1980 budget — $19.396m. — will be spent on policing the safeguards system under the NPT, a programme which the developing countries have come to feel "holds no advantage for non-nuclear weapons countries". It is also considered wasteful.

For technical assistance only $3,197m. has been earmarked, which is to come from voluntary contributions fixed at $10.5m. Till the end of the conference, the traditional venue for pledging contributions, only $5,849m. had been pledged. The president of the conference. Dr. Homi Sethna of India, was constrained to urge those who had not yet pledged to do so at the earliest.

The other approach, also made by newly-emerging nations, was for greater participation in the board of governors for countries in the African and the Middle East-South Asia (MESA) grouping. This, too, was consigned to the board of governors of IAEA. At present North America has 100 per cent representation on the board, Western Europe 34.8; Latin America 31.8; Eastern Europe 36.4; South East Asia and Pacific 38.1; the Far East 38.9; South Asia and Middle East 22.9 and Africa only 21.3.

A number of African delegates and those from the developing world left New Delhi feeling disheartened and in a way empty-handed. But they felt that the week-long conference brought to the fore the dichotomy of nuclear policy and co-operation. It clearly demonstrated the unwillingness of the "nuclear haves" to co-operate except on their own terms. It also served to explode the myth that by signing the Non-Proliferation Treaty, as the "nuclear haves" are demanding, the road to nuclear development is easy.

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BREEDER REACTOR FOCUS OF TALKS BY COUNCIL OF EUROPE

Paris SEMAINE DE L'ENERGIE in French 20 Dec 79 p 5

[Text] The breeder reactor has been the focus of the Council of Europe talks at Brussels, 18-19 December, in which nearly 200 parliament members and experts from the 21 member countries participated. The program's precise title was "breeder reactors: economic and safety aspects." The actual objective was twofold: to inform European legislators about an energy choice already available, but about which people remain very hesitant; to be able, above all, to give a legitimacy to the breeder reactor, which has not yet been discussed as an option for Europe. For example, the Council of Ministries of EEC [European Economic Community] has never taken a position on breeder reactors, although 3 years ago the commision submitted to it an opinion on the question; that EEC unobtrusively subsidize "Superphoenix."

Nuclear experts introduced the discussion and answered the parliament members' questions on five topics; basics and operation, economic interest, combustion cycle, safety and environmental impact. The talks allowed presentations of the two types of breeder reactors; integrated (Superphoenix type), or ring type (in which the sodium exchangers are placed outside the tank). In addition to Phoenix there exist two other projects of the same type at Downrey (Great Britain) and Chechenko (USSR). According to the experts, the most serious problem of the breeder reactor does not lie in radiation, but in the cooling cycle; the sodium used for this process produces noxious fumes in the air and reacts violently with water.

Another question is the combustible which results from reprocessing PWR powerplant wastes. Now reprocessing is not always practical at the industrial level; The Hague powerplant reprocessed only 110 tons in 3 years instead of the expected 600 tons. Experts state that the risk of an accident is not even imaginable, given the number of safety measures if an abnormality occurs and the fact that the powerplant can "naturally" accumulate heat for 20 hours (convector effect). To reduce risks related to transport, the breeder reactor will be sited near the reprocessing center and near the city, whichllimits the possibilities of offshore installation. The power plant would have a 30-year lifespan.

The discussions have been very lively, experts and parliament members favorable to the breeder reactor forming an overwhelming majority. Some deputies are not failing to say that these talks are non representative. Moreover, perhaps the real issue has been avoided during these talks; according to Atomic Energy Commission estimates, the breeder reactor will not be profitable in France until after 2040 and the savings realized at this time would be equal to the investment costs incurred for the entire program!

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BRIEFS

NUCLEAR POWERPLANT PROBLEM--Framatome, the builder of nuclear reactors, and EDF [French Electric Company], the operator have received another hard blow. According to Mr Jean-Claude Leny, Framatome's general director, the cracks sustained on several nuclear powerplant elements have already cost some Fr 120 million for the first series of remedies, and now a new technical problem is worrying safety services. Some valves on the RRA (recooling the reactor at rest) circuit, built by Elliot, an American company, are not completely reliable. In this emergency, safety services hesitate to give the green light for the Gravelines, Dampierre, and Tricastin reactors to begin operations, which should have occurred in December. Framatome and EDF are continuing their talks with nuclear security. [Text] [Paris LE NOUVEL ECONOMISTE in French 14 Jan 80 p 43] 9374

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EXPERTS DISCUSS NEED FOR BREEDER REACTORS

Does Europe Need Breeder Reactors

Geneva JOURNAL DE GENEVE in French 19 Dec 79 p 5

[Text] Lucerne (from our special correspondent Jean-Luc Lederrey)--"Development of breeder reactors is necessary if we want nuclear energy to last for centuries rather than merely a few decades. A failure to develop breeder reactors would be a failure of the nuclear option as a whole." This statement by Dr Pellaud, general director of General Atomic Europe, perfectly sums up the opinion which clearly emerged at a conference organized in Lucerne by the Swiss Association for Atomic Energy (ASEA) and the European Atomic Forum (FORATOM).

For three days, nearly 170 specialists from 19 countries (mainly representatives of the nuclear industry, electric power companies, and research centers) examined the issue of breeder reactors and of their future, especially in Europe. The main conclusions drawn from three days of very intensive discussions and presentations are the following:

1. Development of breeder reactor systems is absolutely necessary if nuclear power is to play an important part in our power resources, as early as the beginning of the next century: development of nuclear power through existing reactor systems exclusively would lead to a dead-end at the beginning of the coming century, because of the relatively limited amounts of uranium reserves (currently operating reactors make use of only a very small percentage of the uranium's energy potential.)

2. The cost of breeder reactors is significantly higher than that of reactors in present systems. This cost will be reduced only when industrial mass production is achieved. In addition, the cost of the fuel cycle associated with breeder reactors is still relatively uncertain. Initially, adoption of breeder reactor systems will not depend on purely commercial criteria; government support will be indispensable. A certain number of "strategic" decisions will therefore have to be made by gernments of western countries in the coming years, and these decisions will have their consequences at the end of this century and the beginning of the next.

3. Breeder reactor research and development programs are proceeding at different rates in six countries mainly, with the collaboration of a number of other countries: the primary ones are France, the Soviet Union, the United States, England, Japan, and West Germany. France is the most advanced in industrial terms. In all these countries, research and development are concentrated on one type of reactor, the liquid-sodium colled fast-neutron reactor. Other types are under study but are of secondary interest.

4. Breeder reactors raise specific safety problems. A special session of the conference was devoted to solutions for this question.

5. Breeder reactors are particularly opposed by those who are against nuclear power. The question of public acceptance thus arises in a particular way with this type of reactor.

Uranium Resources

We will attempt to elaborate on these different points, beginning with the question of uranium resources and the need for breeder reactors.

These reactors are sixty times more efficient than the present generation of reactors in utilizing uranium's potential energy. At the same time, world uranium reserves are limited. According to Dr Baumberger of Motor-Columbus, proven reserves (at a cost of 80 to 130 dollars per kilo; current prices for short-term contracts are around 100 dollars) amount to 1.7 to 2.4 million tons, and additional reserves are estimated at 2.2 million tons. Compared to the demand of current nuclear programs, these quantities would be exhausted toward the end of the 1990's if this uranium were "burned" exclusively in the types of reactors currently in use. Anticipated resources are estimated at between 7 and 15 million tons; these new reserves would postpone a shortage by only a few years.

In Dr Baumberger's estimation, at the beginning of next century, the world and Europe in particular may experience a serious shortage of uranium accompanied by high price increases. In other words, according to demand projections from the International Evaluation Program for the Nuclear Fuel Cycle, a world nuclear program based exclusively on current water-cooled reactors would come to an end by about 2030. Introducing breeder reactors starting in the 1990's would be the only way to solve the problem of uranium supplies, in Dr Baumberger's opinion and in the concurrent view of most of the experts in Lucerne.

Strategy Outline

A certain amount of economic uncertainty still surrounds the development of breeder reactors. The main uncertainty is the investment cost, which could initially be 1.5 to 2 times higher than that of current water-cooled plants. It should be possible to reduce this cost with mass production; experts hope to obtain a cost which would be only 30 to 40 percent higher than that of water-cooled plants.

But conversely, the cost of the fuel cycle (manufacture of fuel elements, recycling, and so on) should be lower for breeder reactors than for current reactors, due notably to the fact that this cost is independent of uranium prices. According to Dr Baumberger, breeder reactors should become commercially competitive with present reactors as soon as natural uranium has doubled its present cost, provided breeder reactor investment costs do not exceed present ones by more than 40 percent.

However, the cost of the fuel cycle for breeder reactors can only be estimated on the basis of present developments, and a certain amount of uncertainty still clouds the estimates.

This is why, during an initial phase whose duration has not been determined, the decision to build breeder reactors cannot be based on strictly economic criteria. In the short run, power produced by breeder reactors will indeed be more expensive than competing power. In addition, the whole infrastructure of the fuel cycle will have to be organized fairly rapidly, which will require heavy investments.

In conclusion, the decision to undertake construction of breeder reactors can only be reached with government support. In Europe particularly, and in the near future -- within the next five years according to Mr A. Salmon, assistant director of British Nuclear Fuels -- governments will have to make decisions of a strategic nature (as a sort of insurance premium, in the opinion of a Ministry of Research expert from West Germany) in favor of a technology which will only become economically competitive a few years later.

Breeders Considered Indispensable

Geneve JOURNAL DE GENEVE 20-21 Dec pp 11, 12

[Text] Lucerne (from our special correspondent Jean-Luc Lederrey)--Industry considers breeder reactors indispensable to the development of nuclear power, as early as the beginning of next senturay. These reactors are not yet commercially available. Their marketing is anticipated for the end of the next decade or the early 1990's by France, which is presently building the world's largest industrial size prototype, the Super-Phenix plant in Creys-Malville, Isere. During a joint conference of ASEA and FORATOM in Lucerne, dozens of experts from all over the world assessed the research and development carried out on breeder reactors in several countries (see our issue of 19 October 1979).

The conference examined opportunities for building breeder reactors, the economic and financial aspects of this field, safety matters, and public acceptance of this technology (it is well known that opponents of nuclear power are particularly opposed to breeder reactors). We presented the first two of these topics in our previous issue. We will now describe the efforts of several countries to develop this field of nuclear reactors.

Breeder reactors have been studied since the early 1950's by a number of countries, first the United States and the Soviet Union, then France and England; Japan and West Germany, a few years ago, also joined the club of the major countries seeking to develop breeder reactors. The development of this type of reactors has proceeded and is still proceeding at very different rates in various countries. France is presently closest to constructing industrial size prototypes and then to marketing breeder reactors. The Soviet Union is also very advanced, but is following a markedly more gradual path. Results vary in other countries, as for example in the United States where breeder reactors are being questioned by the Carter administration itself. Let us examine these various programs in greater detail.

French Strategy

Research on breeder reactors began in the United States in 1946, in the USSR in 1948, in England in 1951, in France and West Germany in the mid-fifties, and in Japan in 1967. This type of reactor has been developing at various rates in various countries.

Currently, France is the most advanced in industrial breeder reactor development, although its program began noticeably later than that of the United States and the USSR. As we know, in 1973 France got under way with the Phenix plant, with 250 MW of power, in Marcoule. France is currently building, in collaboration with Italy, West Germany, England, and the Benelux countries, the Super-Phenix plant in Creys-Malville which should go into operation in 1983 with 1200 MW of power.

France is now studying the introduction strategy for a series of breeder reactors of the Super-Phenix size, as was announced in Lucerne by leaders of the French nuclear program. In this connection, a decision about detailed study of a Super-Phenix II plant will be made in coming months. Construction of Super-Phenix II could begin between 1980 and 1985. EDF intends to order two 1500 MW breeder reactors before 1985.

Soviet Program

With France, the Soviet Union is the most advanced country in the industrial development of breeder reactors. A complete overview of the Soviet program was presented at the Lucerne conference by Dr Kochtov, member of the State Committee for Nuclear Power in Moscow. Dr Kochtov first confirmed that the European part of the USSR is experiencing a power shortage linked to the fact that 90 percent of fossil fuels are located in the eastern part of the country. Development of nuclear power is expected to solve this problem.

In the breeder reactor field, notable Soviet program phases included the construction in 1958, of a plutonium-fueled experimental reactor; the construction in 1969 of a 12 MW reactor; and the construction of a 150 MW reactor in 1973. The Soviet Union is currently completing construction of its first industrial size reactor, the 600 MW BN-600 breeder reactor. A 1600 MW reactor is presently under study.

Soviet experts are in favor of very gradual development of breeder reactors: on this subject, Dr Kochetkov declared that "we have been developing these reactors for 30 years, and we estimate that it may take another 30 years to reach the commercial phase."

Uncertainties of American Program

It is well known that the American program remains uncertain as a result of President Carter's decision to postpone construction of the Clinch River reactor. Studies for this planned 350 MW breeder reactor continue; plans are 70 percent completed and fabrication of components is 42 percent complete, but no construction has begun at the site. Preparatory work will continue in 1980, as decided by Congress. A political decision on the future of breeder reactors in the United States should be reached by 1981.

In the meantime, private companies and the Department of Energy (DOE) are pursuing their research and development on breeder reactors, notably in the testing of materials, fuels, and components for future reactors. DOE's 1980 research budget for breeder reactors amounts to 504 million dollars.

Other Programs

The British breeder reactor program began in 1963 with the first experimental reactor in Dounreay. Another 14 MW reactor was started in 1959, followed by a second one at the Dounreay site, which began operation in 1973 with 250 MW. An industrial size 1300 MW reactor is now being studied. A public inquiry will precede its introduction.

West Germany began at about the same time as France and built its first, 20 MW breeder reactor prototype in Karlsruhe. A second, 300 MW reactor is scheduled for completion in Kalkar in two or three years.

Finally, Japan put its first experimental breeder reactor into operation in 1977, at first with 50 MW, then with 75 MW. This reactor will be modified to attain 100 MW in 1982. A 300 MW reactor will go into construction in 1981. Japan plans to build a 1000 to 1500 MW breeder reactor around 1990, and plans to reach the commercial stage between 1990 and the year 2000.

European Cooperation

Several countries are collaborating relatively closely in Europe in developing breeder reactors: in 1977 France and West Germany signed a cooperation agreement which also includes Belgium, the Netherlands, and Italy. The goal of this cooperation is to jointly develop a breeder reactor. In addition it should be remembered that the Creys-Malville Super-Phenix plant was built by a European consortium including power companies from France, Italy, and West Germany (England and the Benelux countries also participated).

Possible Competition

These European collaboration efforts bring out certain aspects of future breeder reactor commercialization. The question of markets may arise: will there be competition among several producers, among several systems? In Europe at present, as we have just seen, two groups of countries are leading in breeder reactor development: France and its associates, and England. The latter is collaborating with other countries at the scientific and technical level, but not yet at the marketing level. However, its eventual entry in the group led by France is being considered in order to achieve more widespread European collaboration.

Need for International Cooperation

It became fairly clear in Lucerne that international cooperation will be the only solution for the future, at least at the European level. The investments needed for breeder reactor development and the need for parallel investments to establish a fuel cycle industry make it difficult to imagine several national competing systems coexisting in Europe. In addition, it is likely that initially at least, the breeder reactor market will not accommodate more than two or three construction companies operating in Europe. This is notably the opinion of Dr Franklin, general director of the Nuclear Power Cy (GB).

One or Several Models?

Other aspects of breeder reactors will influence future markets. The probable size of these plants (which will generally be between 1500 and 2000 MW) will be such that they would only be installed in large power networks. Therefore at the beginning breeder reactors will probably be more extensively developed in centralized countries (such as France where a single power company covers the whole nation), while they will be introduced more slowly in federalized countries such as Germany (or even the United States where many companies share the market).

Finally, the great majority of today's research and development throughout the world is devoted to one type of reactor, the liquid-sodium cooled reactor. Other options are also under study, notably gas-cooled reactors, which could present cost advantages. But in the opinion of most experts in Lucerne, these options would not become alternatives until much later.

Because of the heavy investments needed to form a network of such breeder reactors, it is likely that consumers will not be offered a choice between several systems: at best, they will be presented with different versions of sodium-cooled breeder reactors.

Breeder Reactors in Switzerland

Geneva JOURNAL DE GENEVE 20-21 Dec 79 p 12

[Text] Is Switzerland planning to build breeder reactors? Not at this time: the size of sodium-cooled breeder reactors (between 1500 and 2000 MW of power) would be too large for our country's network. Furthermore, Switzerland's federalized structure (a great number of companies supply the network) would make an investment of this size more difficult.

However, it will be possible to consider building breeder reactors in 20 or 30 years, when interconnection of European networks has been improved. Such a project would probably be carried out as an international collaboration among several European countries, with Swiss participation. The countries which would build the breeder reactor (inside Switzerland or beyond its borders) would distribute the power produced among their joint network. This is the opinion of a Swiss expert we questioned in Lucerne. At the same time we should remember that our country is pursuing research on breeder reactors at the Wurenlingen center. This research is on gas-cooled reactors, whose size would be smaller than that of sodium reactors, therefore making them theoretically more suited to our country's needs.

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